Engineering and Mining Journal

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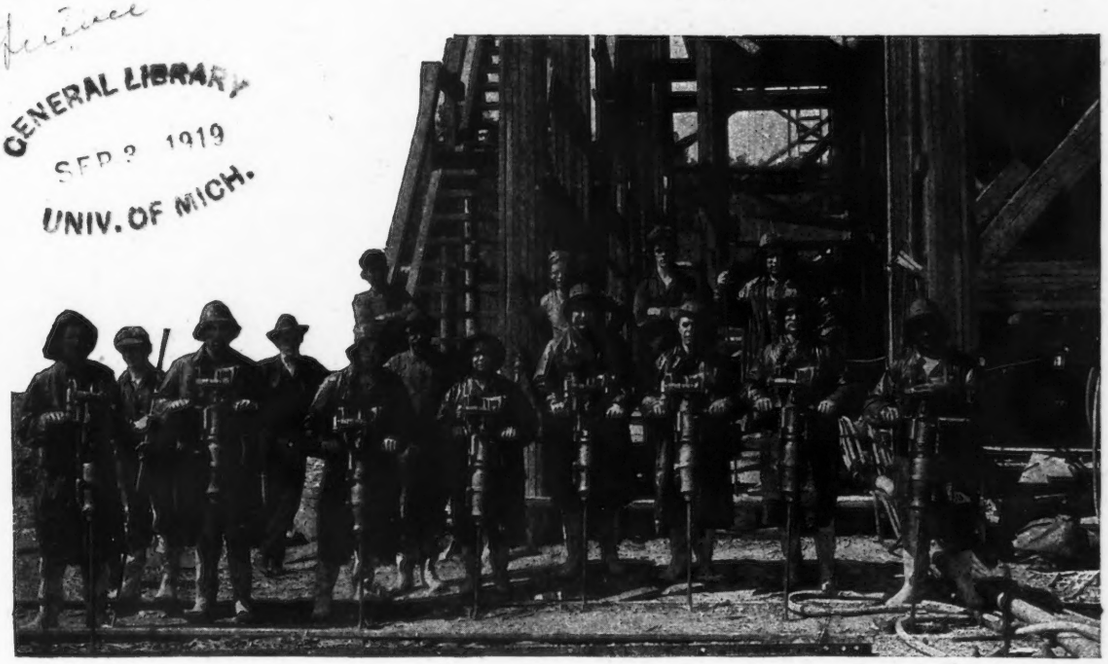

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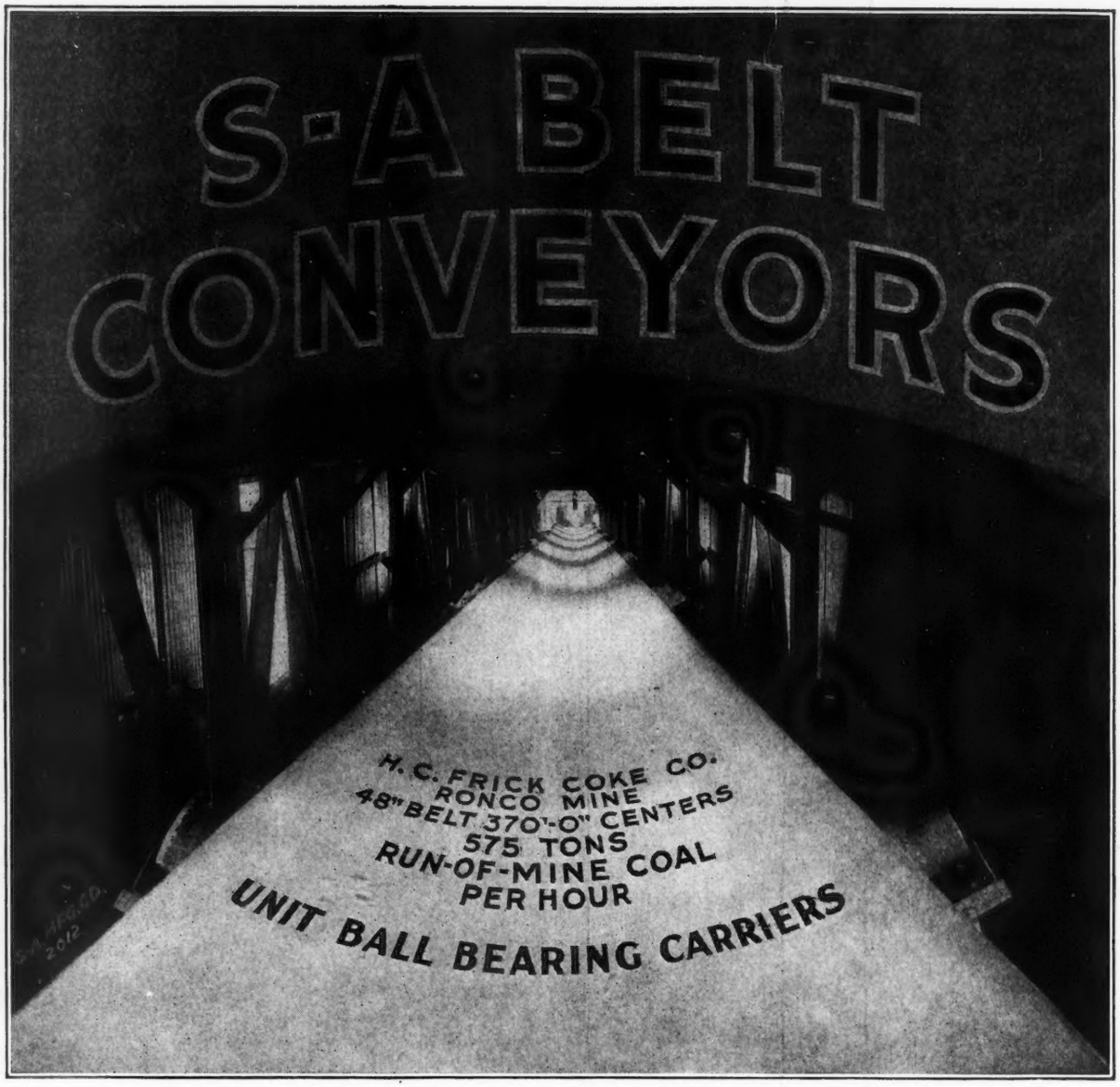

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Engineering and Mining Journal

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A Case for Calm Judgment

A NATIONWIDE railroad strike would bring disaster to the country. The railroad shopmen have voted to strike unless their demands for increased wages are met. Here is a critical situation, requiring thoughtful consideration. The shopmen demand increases in wages which are likely to be permanent, in order to meet a temporary situation which in all probability will last only for a limited time. Increases in wages will certainly result in increasing the cost of production, and therefore the cost of living. Hasty action usually means blundering. The shopmen can well afford to heed President Wilson's request to reconsider their action, before they assume the responsibility of plunging many times their own number into suffering.

The President points out that "demands unwisely made and passionately insisted upon at this time menace the peace and prosperity of the country as nothing else could, and thus contribute to bring about the very results which such demands are intended to remedy." He urges that we should "not be guilty of the inexcusable inconsistency of making general increases in wages on the assumption that the present cost of living will be permanent at the very time when we are trying with great confidence to reduce the cost of living and are able to say that it is actually beginning to fall."

May the hot-headed and unreasonable demands born of selfishness be reconsidered and set aside, and the truly American spirit of co-operation prevail in the present crisis.

Mining Ventures In Foreign Lands

CHAMBERS OF COMMERCE, bankers, manufacturers and producers of raw material daily point to the necessity of the United States furnishing credit to European consumers. They repeatedly call attention to the advantages of stimulating commerce between ourselves and all foreign lands. Already private capital is, in a small way, attempting to make it possible for Europe to buy food and clothing in the United States. Already our banks are establishing branches in foreign countries, and our merchants are endeavoring to create transportation facilities in the aid of commerce.

Banking accommodations and steamship lines, though furnishing the means, are not the sole requisites for the establishment of foreign trade. The things that are of prime importance are the development of the resources of the country, the preparation of its natural products for sale and shipment, and the creation of wants that can be satisfied by our manufacturers. With the development of the mineral and agricultural resources of a land, trade grows and yields profit to the mother country that has sent her pioneers to the wilderness, encouraging and protecting them while getting a foothold in the new region.

As has frequently been pointed out in the columns of the *Journal*, it is nearly always the miner who leads the way. He invests his money, his labor and his life, primarily for his own benefit, but more than incidentally for the benefit of his mother country, to which he ships his ores and from which he draws his supplies. The rancher follows the miner, cultivating, irrigating, or developing stock ranges, and adding to the supply of products to be exported, and to the demand for manufactured articles. Then follow the builders of railways and the organizers of other public-service corporations, all investing funds that are brought from abroad, all contributing to the growth of colonies and adding to the number of private investors. These are the developments that should be fostered; these are the essentials of the foreign commerce that should be encouraged; and in proportion as they are protected and cultivated, or allowed to shift for themselves, so will foreign commerce either live and expand or decrease and disappear.

In the development of trade with South America miners have already done a vast amount of work. Indeed, we commonly think of Chile, Peru, Bolivia, and Brazil as mineral-producing countries, with scarcely a thought for their other and vaster resources, which the agriculturist and the civil engineer will later develop. If we are correct in our assumption that these things must be cultivated and protected if America is to derive any national benefit, and is to have her commerce grow materially and rapidly, it is well to look around and see what the Government has done, and what it expects to do, in the way of encouraging foreign industry, before making heavy investments. Has the United States promised Americans who invest abroad that their persons and property will be protected while they obey the laws of the land? Has she promised that they will be guaranteed the same rights and privileges foreigners enjoy in America? Has she promised that no unjust laws shall be passed or decreed to deprive them of their just right?

Perhaps, as the United States has passed no laws to the contrary, it may be inferred that she considers this her duty, and needs to make no promises. That has been the assumption of many Americans when they have gone abroad to earn their living through labor or investment. We know that England, France, Germany, Japan, Italy, and some of the lesser nations, make a practice of seeing that their nationals receive fair treatment in the land of their labors, and we feel that the great United States will do no less.

As Lord Palmerston said in establishing, or at least in reaffirming, the doctrine which has made Great Britain great, it did not matter to Great Britain if it was the custom of the country to bastinado some man charged with a mere infraction of municipal regulations. No such municipal regulations applied to a British subject, even where the use of the bastinado was customary. Unfortunately, Americans have no warrant for indulging this feeling of safety, and when

the test has come we have seen the Stars and Stripes furled, and our nationals abandoned to their fate. We are asked to encourage commerce; we are asked to invest abroad. We did it in Mexico; and to what extent have our commerce and our investments, or in fact our lives, been protected there?

The soul of Mexico was in her mines, owned and operated largely by Americans. Mexico could not, and our Government would not, care for them. Hundreds of American miners are dead, thousands have gone, and mines all over the country have been abandoned. American colonists who had developed large areas of fertile land have been driven from the country. Today, Mexican lands are being withdrawn by the government and paid for with valueless state bonds. By retroactive legislation the national government of Mexico is attempting to take over the oil wells. That government has appropriated nearly all of the public utilities, which are operated according to the caprice of the federal or state functionaries.

What has the United States done for American nationals in all these years of suffering? Washington has made useless "representations" and "protestations," and the game goes merrily on. This is the protection that foreign investors are offered; this is the inducement to develop foreign commerce.

Senator Fall on March 9th, 1914, told before the Senate an experience he had had in the State Department at Washington. After talking the Mexican situation over with a certain official, it was pointed out to the Senator that "the Americans who were in Mexico were not Americans who were seeking to make homes there and help the country, but they were solely representatives of corporations, there for the purpose of exploiting the people, obtaining possessions, getting hold of dollars, and coming back to this country," and that "they had no right to demand protection for their property." The person to whom the Senator attributes this declaration is no longer in the State Department, but that such a spirit ever prevailed there, indicates significantly the risk that Americans have been compelled to take in the attempt to develop foreign commerce.

Some of the missionary work that is being done, some of the energy that is being put into foreign-commerce propaganda, might well be spent in Washington, in an effort to arouse our servants there to the realization that foreign investments made for the purpose of producing foreign commerce would be more popular if Washington would give some material evidence of its desire and ability to protect those investments.

Gold Statistics, Wars, and Prices

THERE appears in this issue of the *Journal* a carefully prepared discussion of a timely and important subject, one in which mine operators are especially interested. It might have been entitled "The Case of Gold," for it is in their relation to the production of gold that the author, J. R. Finlay, discusses wars and prices.

The value of gold as money, its power to purchase, is carefully followed for the last hundred years, and although reasoning is somewhat confused through large production following new discoveries at certain periods, the fact remains that the purchasing power of gold has diminished with the outbreak of every war of importance. Its reduced value as money has not been confined to the period of hostilities, but has extended for years after peace has been declared, and the period of this depression has been more or less proportional to the magnitude and seriousness of the conflict. Following this line of reasoning, and showing why the depression should exist, Mr. Finlay draws the conclusion that the effect of the world war on the purchasing power of gold will be felt for at least twenty years.

Whether the period of depression is to last for twenty years, more or less, we will never know until the time has passed. The depression is with us now, and, for the reasons given by Mr. Finlay, will be with us for some years. An ounce of gold will not purchase the quantity of supplies now that it formerly purchased. Hence, gold production costs more than it did a few years ago, and it is going to continue to cost more.

To the producer of gold this is a matter of most serious moment. The man or company now owning or operating a gold mine faces a most unpleasant situation. The value of ore reserves has suddenly dropped 25 per cent to 50 per cent, and there are no known economies that may be introduced to offset this decrease in value. Where the margin was already narrow, it has entirely disappeared. Continued operation with the hope that supplies and labor may soon fall, and that losses may be avoided, means a continued drain on the resources of the mine owner, with the chances that the mine will be worked out before better times arrive.

Closing down and abandonment of properties that do not quite pay under present conditions is an equally hazardous thing to do. This means absolute loss of plant and community, where the mine is the life of a community. The conservation of the gold in a low-grade mine may be a proper course for the benefit of the generations yet unborn, but it means serious loss and inconvenience to the present generation.

In view of the decreased purchasing power of gold, and the continuance of this condition over an indefinite period, the reporting engineer has to reckon with a series of factors that have recently changed materially in value. In his eyes a 6-ft. vein of $5 ore is not the same deposit that it was five years ago; the little 3-ft. vein of $10 ore no longer holds the attractive features of the one-man proposition that it formerly held.

Mr. Finlay suggests that one reason for the decreased purchasing power of gold is the relatively large production of the metal during the last thirty years. The greater part of this metal went into coinage, but the use for the coin did not keep pace with the supply. The peak of this production, however, is passed, so far as we can now see, so that the man with a gold prospect or undeveloped mine has at least one optimistic aspect of his proposition,—the known supply of gold ores is gradually diminishing. This, however, is but a faint ray of hope, and it appears that gold mining must share in the readjustment of industries that is now taking place, and will continue to take place during the next decade.

When Is It Time To Intervene?

WILL a loss of $15,000 by the Government change its policy toward Mexico? It seems an inconsequential circumstance to cause such a rumpus, and yet in this loss, and in the steps which have followed it, we can see the germ of improved conditions across the border. Sixty thousand troops on our frontier, so long

as they remain on the northern side of the border, do not in the least accentuate the protests and representations sent from our State Department. But let one troop of cavalry cross the line to inflict punishment where it is needed, and the whole of Mexico takes notice. President Carranza demands through his ambassador that our troops be recalled. Every periodical of Mexico discusses the seriousness of the situation; some publications condemn the dishonoring of their soil by the foot of the northern invader, whereas others demand a change in the policy of their government toward foreigners.

It matters little what they say. The point we would make is that a demand accompanied by the slightest show of force is understood by one and all. To a few it suggests war; to many it suggests the idea of intervention. According to a well-informed publication of Mexico City, "Intervention is to be feared by a few, by those who now rule Mexico. Eighty per cent of her population are entirely indifferent, while 90 per cent of the educated class would welcome it."

We would not care to guarantee these figures, but we are very certain that the Mexicans most antagonistic to foreigners are its present officials—those whom our Government has recognized and tried in every way to support. We are equally certain that a very large percentage of the population of Mexico has no faith in the ability of these officials to bring order out of chaos.

We are inclined to believe that Representative Kahn is right in advising armed intervention. A little of it has proved efficacious; more of it may produce correspondingly beneficial results. The New York *Times* criticises Mr. Kahn's suggestions as ill advised at this time, because the 15,000,000 people of Mexico may choose to continue guerrilla warfare; because it would take many more than 100,000 men to pacify the country, and cost a lot of money, and, again, because some of our South American neighbors might not approve of the action. We confess that we do not know how many men would be required to do the work, nor how much money it would take, but we do know that the resources of Mexico under peaceful conditions are ample to pay for the maintenance of order and the administration of justice, and to pay all of her long-overdue obligations and damages resulting from civil strife.

The 15,000,000 natives are much more anxious to to be free from heavy imposts, and to have plenty of beans and corn, than they are to engage in profitless guerrilla warfare, and although some of our Southern friends might not approve of the move, that would not alter the justice of the act.

"Armed intervention can wait awhile" says the *Times*. "There is a general agreement that something should be done, and done quickly. . . but to make war on Mexico when a more sensible and humane method could be found to teach her the lesson needed would not be the part of wisdom." In the name of all that is good and true, what is that sensible and humane method? Foreigners and natives alike have suffered untold agonies and destruction for eight years while we have sought in vain for the humane method, and it has not been found.

The *Times* answers this question in the same editorial: "If President Carranza cannot suppress brigandage on the border, if he cannot protect our people in the Tampico region, it can be done in a thorough fashion by American soldiers and marines. A few such lessons, and there would be order on the Mexican side of the border and peace along the coast, and at no great cost, too." The *Times* is absolutely correct, but we fail to see the difference between Mr. Kahn's suggestion and the sensible, humane method of the *Times*.

Protection to Investors In Oil and Mining Stocks

UNDER date of Aug. 4, the State Corporation Department of California issued a list of certain oil and petroleum companies that have, as the circular states, not complied with requirements of the California Securities Act ("Blue-Sky Law"), and that have offered their securities for sale in California contrary to the provisions of the act. Copies of the circular may be obtained from the California State Corporation Department at Sacramento, Cal. E. C. Bellows, California Commissioner of Corporations, in a letter which accompanies the list, says:

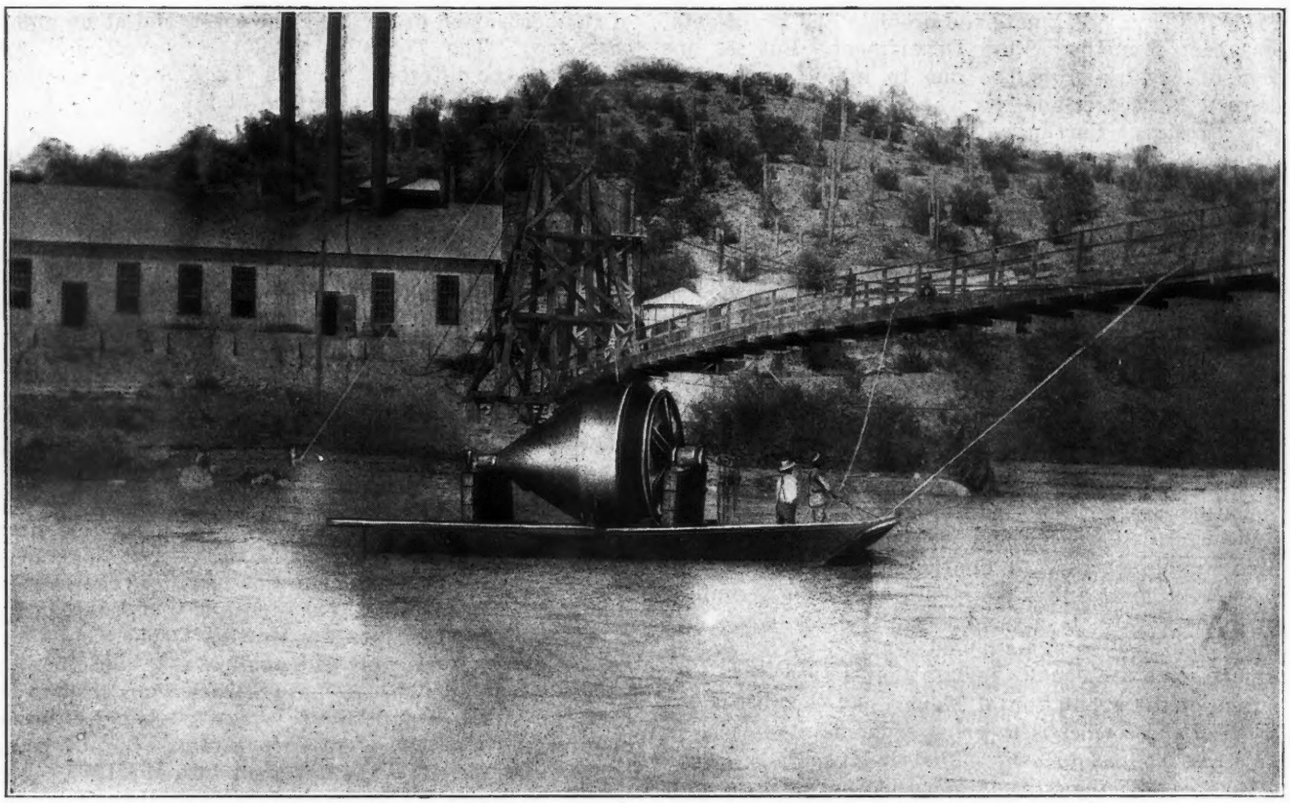
"It is obvious that corporations which find it necessary to evade the provisions of the Corporate Securities Act are not organized for the benefit of the investing public. An initial examination and subsequent supervision by the State Corporation Department may be obtained by a company at a nominal cost, and the aim of the department is to have corporations generally conform to the standard of integrity that has been manifest among the decent corporations of California, both before and after the law went into effect."

Mr. Bellows does not maintain that the securities of the companies listed are all of dubious value, but goes on further to say:

"The securities offered for sale by some of these companies may form an attractive investment. Others may be of doubtful value, and some of them may be entirely worthless. There is no intent on the part of the commissioner to limit the right of people to engage in speculative enterprises as long as they are fairly conceived and honestly conducted. However, the investing public has the right to be fairly informed of the hazards which may be encountered and to have such regulations enforced as will protect it from fraudulent schemes and unprincipled schemers."

The protection of the investors from fraud, and provision for the proper spending of money in the development of an enterprise, whether highly speculative or conservative, are of great importance to the mining industry. There would be only a small industry if a widespread desire to take a chance when the opportunity is offered did not exist. It is this speculative tendency that is responsible for the opening out of new mining districts and the continued growth of old ones. Many are glad to go into an enterprise if only they can be assured that they will have an "even break" for their money.

The effective working out of the "Blue-Sky laws" has taken time, and for a considerable period there was a feeling among some that the operation of such laws would stifle enterprises of a speculative nature. Such has not proved to be the case. On the whole, they are becoming effective, and in proportion as greater experience is obtained by their administrators they will become more effective. In the specific instance that has come to our attention the possession of a list of companies which have failed to comply with the "Blue-Sky Law" in California is of great practical value to the intending investor in oil stocks.



TRANSPORTING MACHINERY ACROSS GILA RIVER FOR KELVIN SULTANA MILL, KELVIN, ARIZONA

Photographs From the Field

MAGNETIC CONCENTRATING MILL OF CHATEAUGAY ORE AND IRON CO., LYON MOUNTAIN, NEW YORK

Gold Statistics, Wars, and Prices

Industrial and Financial Disturbances Have Followed All Armed Conflicts in the Last Century—The Relation of Gold Production to the Law of Supply and Demand—Marked Decline in Production for the Last Decade

BY JAMES R. FINLAY

THE statistics of gold production are easily obtained and on their face show remarkably little change during the last ten years. It is a commonplace that the war period, 1914 to 1919, more especially the later part of it, was unfavorable to the business of gold mining. Other commodities and labor were in acute demand at prices far above those of former years, but gold remained nominally at the same price. Actually, of course, its price went down in proportion to the decline of its purchasing power. This finally resulted in a rather abrupt decline in production.

But the decline caused by war conditions does not fully explain the position of gold. It is reasonable to suppose that the output would have declined anyway in recent years, or at least would not have increased. South Africa accounts for half the world's yearly supply. The increase of production from 1900 onward has been largely the growth of the South African industry. In fact for the last fifteen years the African production has been the one source of supply that has raised the world output; without it there would have been a considerable falling off. Thus, in 1904 the world production was $347,377,000, of which Africa yielded $85,913,000, leaving for the rest of the world $261,464,000. In 1915, the year of greatest output on record, $468,725,000, Africa yielded $217,852,000, leaving only $250,612,000 for the rest of the world. In 1917, Africa produced $214,614,000; the rest of the world only $208,976,000. It is true that disturbances in some countries, notably Mexico and Russia, had something to do with this falling off, but this was not a controlling factor. The main thing is that no new supply of gold ore has been discovered; no new process for obtaining more gold from known sources.

MAXIMUM TRANSVAAL GOLD PRODUCTION IN 1912

The output has varied with the exploitation of districts already under operation. The Boer War, 1899-1902, retarded the growth of mining in the Transvaal, but as soon as recovery had been made from that, and the district had reached full and unhampered activity, the output of that country rapidly approached its maximum, and practically reached it in 1912. Since that year, with the exception of a spurt in 1915, there has been no indication of an increase of gold production. There does not seem to be any reason to anticipate a rapid decline in the near future; but to expect the gold industry to hold its own for the next ten years is about as optimistic as one can reasonably be if reliance be placed on all factors turning out favorably.

Despite these facts, the price of gold has declined. Complaint of the high cost of living was general, even before the war. The amount of other commodities which a given amount of gold would buy has diminished steadily ever since 1894. The strange thing is that this diminution of purchasing value was accelerated during the war in the face of an apparently increased demand. These facts suggest various explanations:

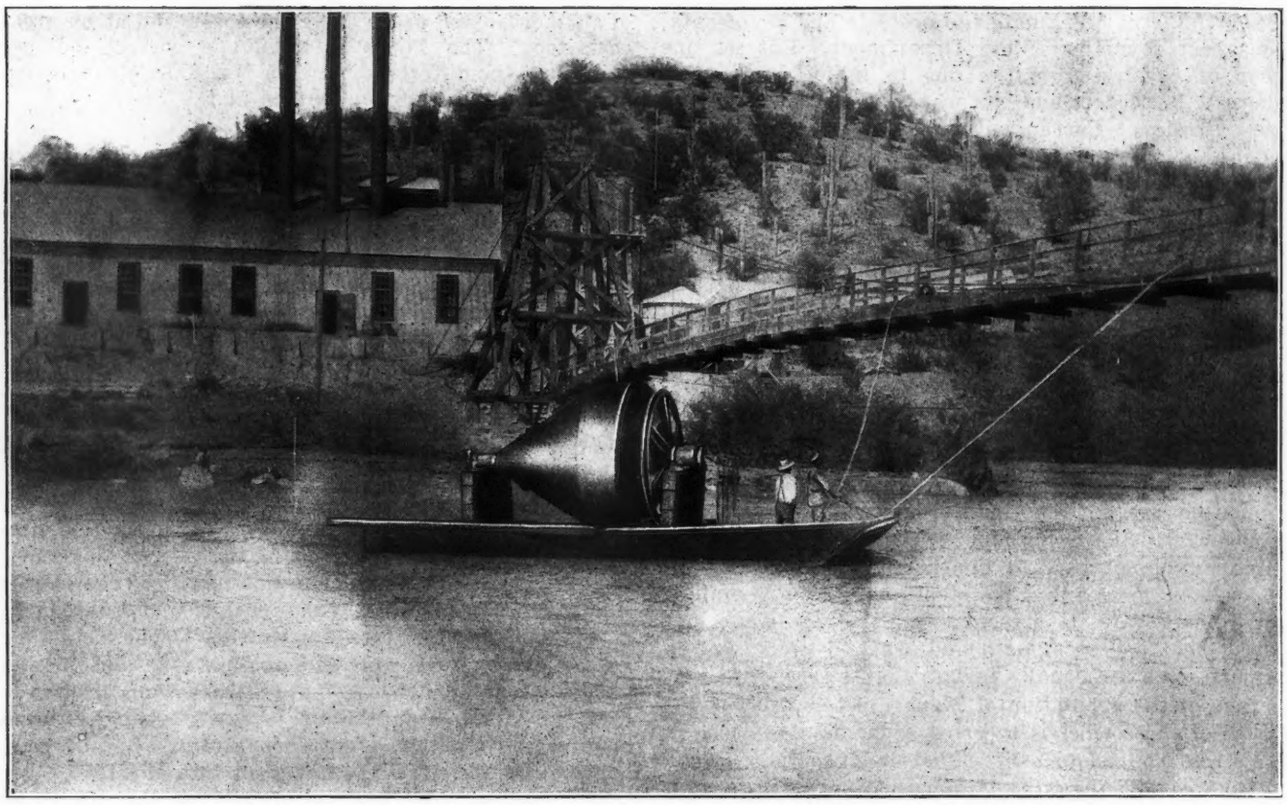
1. It is not improbable that the money value of gold is governed, not by the current output, but by the total amount available in the world. Other metals, once put in use, are not available to any large extent for other purposes. Thus, iron put into railroads, buildings, machinery, tools, and like utilitarian purposes, generally stays in those allocations until it is destroyed by rust or wear. Its manufacture is specialized for certain purposes. In general, it is cheaper to make new iron for a particular use from the ore than to remelt old iron, because such iron is not generally fit for the new purpose. Lead and zinc are used largely for paints, from which recovery of metal is impracticable. Copper is not so completely fixed, perhaps, nor quite so destructible, but by far the greater part of it is put at once into permanent structures from which it is seldom removed. Silver, even, is exposed to considerable destruction by use in household ware, ornaments, corrosion and the wear of common small coins. But gold is not put to any large extent to any fixed allocation. It is merely locked up in treasure vaults to be used as standard for exchanging commodities. Some of it, of course, is used for ornaments and for coins, but even these are jealously guarded.

THE AVAILABLE SUPPLY OF GOLD

Almost all gold is capable of being remelted and put to another use. About the only means by which it is destroyed are the absorption of small amounts in chemicals, the wear of jewels and coins, and absolute loss. Thus the large output of the last twenty years has swelled the stock of available gold immensely more than similarly increased outputs of other commodities have increased the available stocks of those commodities. For instance, the available stock of manufactured or usable iron or copper or wheat ready for consumption is seldom more than a year's supply. If new supplies should be cut off, some part of these metals could be taken from the less imperative uses and put to more necessary ones; but there would be an immediate curtailment of industry, production, and comfort. The people would be headed straight for want and disaster. Of the iron and copper produced a hundred years ago, only an infinitesimal fraction is available for commercial purposes today; but, in the case of gold, a large percentage of that produced a hundred years ago is undoubtedly still subject to exchange. In view of these considerations it becomes interesting to reflect upon the following statistics:

THE RECORD OF GOLD PRODUCTION

The production of gold was stagnant and comparatively small until about 1850, when the great historic discoveries in Australia and California suddenly tapped the gold resources of two virgin continents. These supplies seemed abundant for all necessary purposes. In 1853, the output reached $155,500,000. This remained the record output for forty years, until 1893.



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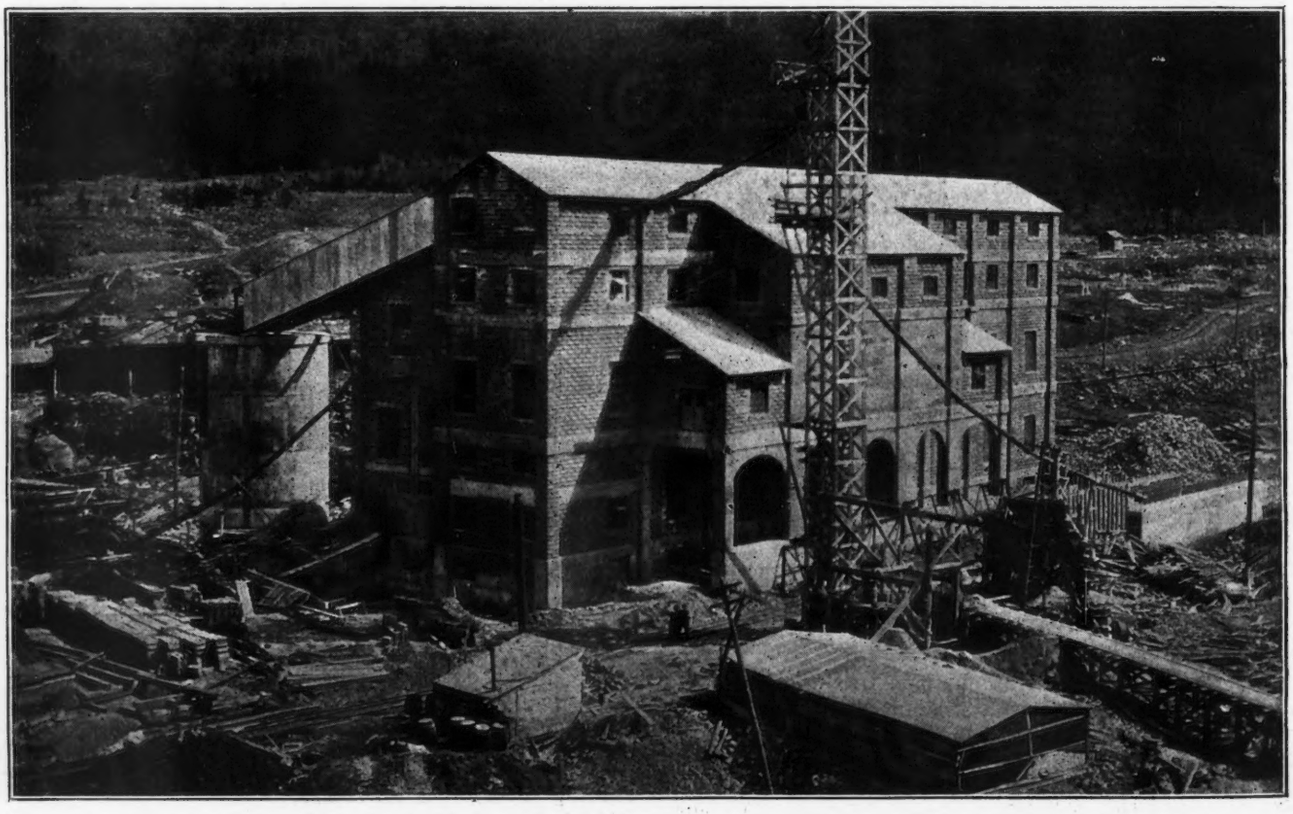

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The production of gold was stagnant and comparatively small until about 1850, when the great historic discoveries in Australia and California suddenly tapped the gold resources of two virgin continents. These supplies seemed abundant for all necessary purposes. In 1853, the output reached $155,500,000. This remained the record output for forty years, until 1893.

Production stagnated or declined, going as low as $90,800,000 in 1874, and to $95,400,000 in 1883. In forty years, 1851 to 1890 inclusive, the total production was about $4,500,000,000. About 1890 a revival of gold mining took place, the production climbed to a new maximum of over $460,000,000 in 1912, and the total production of thirty-eight years, 1891 to 1918 inclusive, was $9,500,000,000.

There seems to be reason to believe that the world's stock of gold is at least three times as great in 1919 as it was in 1890. Various influences are in favor of the conservation of the metal. It is reasonable to believe that between 1850 and 1890 the proportion of the annual production lost through wear and wastage was much greater than it has been since then. Gold coins were in much more common use. The population among which the metal was exposed to absorption was proportionately greater. In 1890 the new gold per capita was only about 10 cents per year; in 1915 about 30 cents. Now, suppose that at all times each person wears out 5 cents' worth of gold a year. In 1890 such wastage would have been 50 per cent of the total supply; in 1915 it would have been only 16⅔ per cent.

Gold Production Decreasing

From these observations it may be perceived that though the annual production of gold is not increasing, but actually diminishing, the amount may still be sufficient to swell the available stock of gold even beyond the proportionate demand for it. It is not unlikely that between 1860 and 1890 the stock of gold did not increase in proportion as fast as the general business of the world, and its purchasing power steadily increased, but that since 1890 the stock has increased faster than the world's business, and its purchasing power has proportionately diminished. It is probable that about 1890 the supply of gold ran so low that the demand for it would account for the low prices for commodities of the early '90's. To illustrate this, consider some hypothetical figures.

Suppose that the available stock of gold in 1850, the accumulation of all former times, was $1,000,000,000, and that between 1850 and 1890, half of the gold produced was added to the stocks. The accumulation would be about $2,250,000,000 in the period, and the total supply in 1890 would be $3,250,000,000. Assume, further, that of the total gold produced since 1890, an amount equal to 80 per cent has been added to the stock. The accumulation would be $7,600,000,000 for the period and the present total amount would be $10,850,000,000.

Relation of Gold Supply to Industrial Development

If these figures are even approximately correct it becomes probable that the stock of gold in proportion to the production of the chief staples of commerce is much greater today than it was in 1890; that is, there is more gold in existence today to be exchanged for available iron, coal, copper, wheat or cotton than there was in 1890. In this connection it may be remembered that in the latter part of the nineteenth century the expansion of the world's commerce was proceeding at a rate that perhaps has not been equaled since then. It included the opening up of the interior of America, Australia, and Africa, the construction of nearly all existing railroads, the development of mechanical manufacturing, the factory system of employment, and the creation of most of the great industrial corporations. Since that time business and wealth have continued to expand, but more through the development of specialties and refinements, less, perhaps, through the discovery of new resources and process, and very likely not at the same rate as in the earlier period.

2. Emphasis should probably be laid upon the tendency to conserve gold more and more for the purposes of exchange. Gold for many years has been handled almost exclusively by banks and the treasuries of the leading nations. Its use as common coin has proportionately diminished. Of late years, as a war measure, all the leading belligerents have suspended specie payments, so that the ordinary citizen has scarcely been able to obtain gold for any purpose. It seems possible that this should be regarded as an additional and special factor superimposed upon the tendencies outlined. It makes gold as a medium of exchange seem distant, even imaginary; it enables governments to make gold go further than ever as a basis of money, and makes the average man use "money" with less and less thought of obtaining the metal.

Gold More Plentiful Than Goods

At any rate, whatever the relation of gold to prices, it is evident that, as a result of the recent war, gold, for the uses to which it is put, is relatively more abundant than are the principal staples of commerce. Apparently this is the result of every war to a sufficient degree to cause extensive borrowing by governments, the diversion of large numbers of men from productive occupations, the derangement and prostration of industry through interruption of supplies, and the laying waste of productive areas. If conditions were normal, considering the feverish demand for exchange, a strong demand for gold at the present time might be expected; but the feverish conditions are in themselves a proof of want, and the want of food, tools, and equipment is more consistent than the demand for gold.

A book should be written upon the effect of great wars upon prices and general economic conditions. I have inquired for such a publication, but have not heard of one. In the absence of an authoritative discussion, I am tempted to put down a few observations that I have been able to glean from various sources.

Industrial Status of Napoleonic Era

At the time of the Napoleonic wars the modern industrial world was in its infancy. Only one country—Great Britain—had made any progress to speak of in the use either of mechanical power or intensive manufacture. The population of the leading countries of Europe was from one-quarter to three-quarters of what it is today. Production was generally by handicraft and not by the factory. Transportation of staples was only beginning. Commerce, therefore, between distant points had been confined largely to rare and valuable fabrics and luxuries. Dependence upon the resources of other continents was not at all general but was confined almost entirely to the countries at the western fringe of Europe. During that war an almost complete monopoly of ocean traffic fell to Great Britain and to the comparatively feeble and loosely organized United States. Through this combination of circumstances Great Britain, although at that time producing little or no gold from her own territories, undoubtedly became the principal gold owner of the world and adopted the gold standard. It was a period of general enlight-

enment, of increased knowledge of distant countries, of progress in natural science, of bold intellectual speculation.

THE FINANCIAL PANIC OF 1819

The economic effects were chiefly the diversion of handicraftsmen into military pursuits, including the manufacture of military supplies, and a derangement of ocean commerce which, after all, deprived only a comparatively small number of people of their accustomed supplies. Furthermore, there was an increase of the public debt, which in the case of England, at least, dwarfed anything ever known before. These causes were sufficient to produce a general and prolonged rise in the price of many commodities of general commerce. It is probable that in producing those commodities that were made almost entirely from local raw materials and depended little upon trade (in which a larger part of the population was then engaged than now) the effects varied greatly from place to place, depending upon whether or not they were exposed to direct ravages. The wars themselves were confined to a period of twenty-five years, but the prices of some commodities continued high for forty years, or for fifteen years or more after the war. The economic readjustments at the close found expression in an acute financial panic in 1819, four years after Waterloo.

EFFECTS OF NINETEENTH CENTURY WARS

In the middle of the nineteenth century, between 1855 and 1870, a number of comparatively localized wars disturbed the industrial world. Of these, by far the most important was the Civil War in America. The Crimean War of 1855 and 1856, the Italian War of 1859, the Austro-Prussian War of 1866, the Franco-Prussian War of 1870-71 were either short lived or affected regions of slight industrial importance. But the combined effects were a considerable increase of public debt, very large in France and the United States. During the Civil War there was an important stoppage of one of the world's chief staples—cotton.

Again, there was a prolonged rise in the price of commodities, which culminated in 1864, but which persisted at least until 1880. It may be remarked, in passing, that the severe financial panic of 1873 had little effect on checking the high prices.

DISCOVERIES IN CALIFORNIA AND AUSTRALIA

Just preceding this series of political disturbances occurred the unprecedented discoveries of gold in California and Australia, which not only increased the supply of that metal at an extraordinary rate, but stimulated exploration, colonization, enterprise, and trade in all parts of the world. At no other period in the world's history, except, perhaps, at the time of the Spanish conquests of Mexico and Peru, was the supply of gold increased so rapidly or so generally distributed. The concurrence of this fact with a period of political disturbances and a succession of wars brings about a confusion of economic causes which it is probably very difficult to unravel; but there is certainly every reason to suppose that the increase of gold supply had a good deal to do with stimulating demand and raising prices.

After the Franco-Prussian War there supervened a period of general tranquillity among the chief civilized and industrial nations that lasted, with slight interruptions, for about forty years. In the earlier part of this period there was a general payment or reduction of public debts and also the stagnation and decline of the output of gold, together with a great expansion of agricultural development. Prices steadily declined until about 1895. At this date the payment of public debts had ceased and the reverse tendency began. Just what caused this condition I have not inquired into critically, but it is not improbable that it was attributable to the renewal of internationel rivalries, the increase of armaments, and the initiation of national enterprises. At the same time the production of gold had for several years increased rapidly.

The events of the mid-century find some parallel in more recent ones. Again a greatly increased gold production concurred with a period of general prosperity. Wealth and luxuries were produced in unexampled profusion and in new forms. The gas engine, the automobile, and, finally, the airplane were developed and added much to the convenience, activity, and information of millions. Industry was organized in immense units, producing the staples of commerce with much greater facility and in many times greater volume than had ever before been known. These activities centered in certain areas which became the industrial clearing houses of the world. Those areas became populated to such an extent that the people in them were and are absolutely dependent for their prosperity and even for their subsistence upon the constant interchange of staples on an immense scale.

DEVELOPMENT OF NATIONAL RIVALRIES

Great Britain was the first of the principal nations to feel conscious of such dependence upon trade, but with the rapid increase of population, manufacture, and commerce in Germany, that nation became thoroughly conscious of it also. On the other side of the world, too, Japon found herself confronted with the same problem. Thus the principal industrial areas of the world were, by the measure of their indigenous resources, overpopulated. In Europe these areas were occupied by different nations, each imbued with jealousy of its neighbors and intensely unwilling to permit the continuance of its trade, and therefore of its life, to be in any measure at the mercy of its rivals. Thus overpopulation was certainly the underlying cause of formidable international rivalries, giving rise to innumerable schemes of expansion, aggression, and defence; and determining the tone of thought by which such schemes were supported.

The series of wars prompted by these motives has already been long. It includes numerous minor conflicts incident to colonial aggressions of the Europeans, though the collisions between great nations were avoided until the Russo-Japanese War of 1904-1905. But war in Europe was constantly brewing, and was with difficulty avoided on many occasions. Finally, a furious war, all the more violent because so long repressed, involved all the principal nations of the world.

PROBLEMS CREATED BY THE GREAT WAR

The events of the Great War have accentuated rather than mitigated, in Europe at least, the force of the economic conditions outlined. Those who take pains to look the situation in the face must be impressed with the following facts: The total white population of the world is about 600,000,000. Of these, three quarters live in Europe. The total area occupied by white populations is about 20,000,000 square miles, a good part of which is in the circumpolar regions of America and Asia and another portion in the deserts of Australia,

Of this population, half at least, both in number and in area occupied, have been thrown into a state of political revolution and social and economic chaos, and are today suffering in varying degree from all the distress incident to such terrors, from starvation, exposure and danger. Out of the ruins of the empires of Russia, Germany, Austria, and Turkey a number of small nations have been created, or resurrected, without fixed organization, all jealous of their neighbors; some already at war with each other, and each nation far less self-sustaining than the larger units from which it was broken. When it is considered that revolutions, once started, are hard to stop and frequently go on from one stage to another for generations, it is hard to look upon the general situation of the white race with much assurance of a complete return to tranquillity and prosperity.

These conditions do not affect the Anglo-Saxon world within its own territories as they affect every other white nation. The Anglo-Saxons are, as I have pointed out elsewhere, richer in resources, stronger in industry, and firmer in political organization than any other nation; and these facts have been demonstrated as much by the recent war as by anything that ever happened. But the solidity of the English-speaking countries is not the only factor in their relations with the world, unless they can shut out and ignore the rest of that world—and that is precisely what it is proposed not to do.

The economic consequences of such a cycle of events have been just such as one might expect from an attentive consideration of historical parallels. But in this case the tendencies that have been visible on former occasions have operated with multiplied intensity. Prices of staples have been forced to heights only the extreme peaks of which have been passed. It is hard to escape the conclusion that the main factor in these high prices is the tremendous national borrowings. The world has financed itself with promises. There has been a steady decline in the purchasing power of these promises.

War Debt Now $200,000,000,000

To return to the general figures mentioned, there are 600,000,000 white people divided among various nations. These nations owe about $200,000,000,000. At a conservative average, each individual owes about $300 and each head of a family $1,500. The theory is that these sums must be paid, principal and interest, not out of product but out of profit—out of savings. It is only, of course, when these debts are owed by one nation to another that these sums mean an actual transfer of goods. The debts of a nation to its own citizens can be paid only through taxes from those citizens, so that, although the process may affect individuals variously, in a national sense it is merely a transfer from one pocket to another. The overwhelming preponderance of public debts must be of this nature. But is it not true that the necessity of giving these pocket-to-pocket transfers the semblance of real money is the potent cause of marking up prices? How can it be avoided?

Actual Wealth Is in Commodities

The actual wealth is not money but goods. A nation can produce only a given amount. To repay itself vast sums of money through taxes for interest and principal can be accomplished only through adding to the value of the goods the amount of the taxes. As this addition to value is not expressed in goods, but in money, it follows that the sum total of goods must be expressed in a larger amount of money, i.e., in inflated or imaginary value, a decreased purchasing power of the dollar, or higher prices—all these expressions meaning the same thing.

Hennen Jennings has pointed out that the only effective check upon the progressive depreciation of the unit of value through these causes is free payment in gold. An ounce of gold is divided into something over twenty dollars. It costs as much effort and as much goods to produce the gold ounce or the gold dollar as it ever did. Therefore, so long as the dollar actually represents a given amount of gold it will always represent a given amount of effort. If a given amount of effort made highly efficient by improved organization and appliances can be made to produce a greater amount of goods, it is likely, also, to produce in a general way a proportionately greater amount of gold. The only influences that would permanently alter this relationship would be fundamental causes, such as the discovery or exhaustion of great sources of gold by which the metal might become relatively easier or more difficult to obtain. When it is obtained only at greater effort than is necessary in the acquisition of other commodities, or through consumption in process of its production of greater quantities of other commodities, then, if secured at all, it must be acquired through the use of greater quantities of those commodities, and it will be manifestly equal in value to a greater quantity of them—will buy more of them. Prices will then be low.

The contrary process is equally imaginable and to specify it would only be repetition.

Determining Influence in Gold Production

Thus gold, if freely used, is probably as dependable and fair a medium of exchange as could be devised. It may be remarked further that its equilibrium is maintained in the long run through natural causes which, of course, do not operate instantly, but which do tend to confine the oscillations of value between comparatively narrow limits. If gold is produced in quantity greater than the demand for it, people will not pay so much for it in commodities. This is equivalent to a rise in cost which will force some producers out of business. On the other hand, if the stock of gold runs short, prices will be low, and the inducement to mine more of it will return.

It is pertinent to remark that the influence of prices upon gold production is bound to be felt in the long run, regardless of the cause of the change of prices. It makes no difference in the ultimate effect on the gold industry whether high prices are brought about by the existence of an abnormally large stock of gold, or by the shortage of commodities brought about by decreased production of them for any reason—wars, disasters, disorder, or famine; the tendency will always be to curtail the production. Such influences will bring about considerable swings in the popularity of the industry. The reasons which operate to make gold mining unprofitable will discourage or diminish the search for gold. Plants will go out of business, and a considerable period will elapse before the counter-swing will have much effect.

The gist of these considerations is that in the cycles of high and low prices it is possible to discern the operation of common economic laws. An outburst of national borrowing is in itself either a diversion of labor from its usual channels of production or an evidence of

distress brought about by the shortage of production from some other cause. It will either produce high prices or be produced by them. On the other hand, the widespread liquidation of borrowings can be accomplished only during the periods of tranquillity when labor is employed in full measure for the production of private wants, when there is freedom from calamity. A war, therefore, unless it is local and insignificant, is sure to raise prices. The more general and violent the war, the wider its effect in raising prices. Moreover, the effect of war is not confined to the period of organized military effort, but will persist as long as the exhaustion of resources, the impeding of traffic, and political and social disorders prevent the resumption of peaceful industry in an efficient manner.

The inducement to produce gold will naturally follow upon these influences. Its production will be curtailed during the whole of the period of high prices and high costs, and will not be resumed with full impetus until it has been encouraged for some years by low prices, which means a glut of the chief staples.

Long Period of Inflated Prices Probable

It certainly is to be expected, and feared, that the present situation of the world indicates a long-continued period of high prices for reasons which may easily be summarized in the order of their importance:

1. Every new or revolutionary government is necessarily unstable. Every nation between the Rhine and Vladivostok and from the Arctic Ocean to the Mediterranean and the Himalayas is the seat of potential, even prospective, revolution. The population of this tract is as follows:

Russian Empire	170,000,000
German Empire (including Poland)	65,000,000
Austrian Empire	53,000,000
Balkan States and Turkey	40,000,000
Total	328,000,000

Every nation in this group is confronted with a long list of burdensome tasks which must be accomplished despite the probability, according to historical precedent, of having its projects deranged by internal disorder. It must establish, or re-establish, public and private credit. It must establish new, or re-establish old, lines of trade and traffic. It must restore or replenish its stock of staples and raw materials, and it must make provision for the payment of foreign debts. How easy it is for national and racial jealousies, actual or latent disorders, to prevent all this, not only locally but throughout the whole area!

2. The white populations unaffected by revolution are as follows:

British Empire	60,000,000
United States	100,000,000
France	40,000,000
Italy	35,000,000
Spain, Portugal, Netherlands, Scandinavia	45,000,000
South America—Brazil, Argentina, Chile	20,000,000
Total	300,000,000

These countries are in control of the resources of the greater part of the world, but by a very unequal division. Of the chief resources, the Anglo-Saxons control the preponderance. On the whole, however, there is nothing to prevent this group from resuming, or even increasing, its former prosperity. By returning to peaceful industry, the major portion may soon replenish its warehouses. The chief difficulties are the curtailment of national expenditure and the liquidation of foreign debts. To whatever extent these operations are dependent upon the prompt payment of obligations and a resumption of good feeling by the great disturbed populations of central and eastern Europe, northern Asia (and it may be added, perhaps, of China and Japan), their success can hardly be regarded at present as other than doubtful.

Even if it is reasonable to believe that the recent cycle of political, social and economic disturbance has passed its acute stage, it still remains certain that these distractions have operated upon a scale and with an intensity scarcely ever known before; and the time required for recovery should logically be at least as long as at any former period. On this reasoning one might expect that the present cycle of high prices will not have fully subsided until about 1940, at the best.

If one were looking for an example of the comparative instability of precious-metal mines, and the dependence of the world for its supplies upon a constant search for deposits in all parts of the world, one would need go no further than to note the changes in the list of representative gold mines, selected particularly because they seemed the most substantial of their type. In the short interval of ten years the Alaska-Treadwell group has practically gone out of existence. So has the Camp Bird, El Oro and Esperanza, the Robinson, the principal Kalgurli mines, and the Goldfield Consolidated. Of those still running, in some cases with a marked decrease of prosperity, one may name only the Homestake, the Liberty Bell, the Kolar mines, and the Portland. Thus the operations that have practically vanished are about ten out of seventeen, about 60 per cent.

Decline in Producing Districts and Little Progress in Metallurgical Methods

This is not all. In the interval two great projects in Alaska for mining the low-grade gold ores of the Juneau district have been initiated, supported enthusiastically, and have proved themselves dismal failures. Districts have not been so roughly treated as individual mines, but even districts have so nearly lost their importance that it is scarcely an exaggeration to say they have vanished. To specify such vanishing districts one may name Douglas Island, Juneau, Ouray, Goldfield, El Oro and Kalgurli. In Cripple Creek and Kolar the output is steadily on the decline. Only at the Homestake and the Transvaal has there been an increase. The latter district produces half the gold of the world, but substantially from a new group of operations, which, however, merely represent a migration, enforced, of course, to lower levels and outlying tracts.

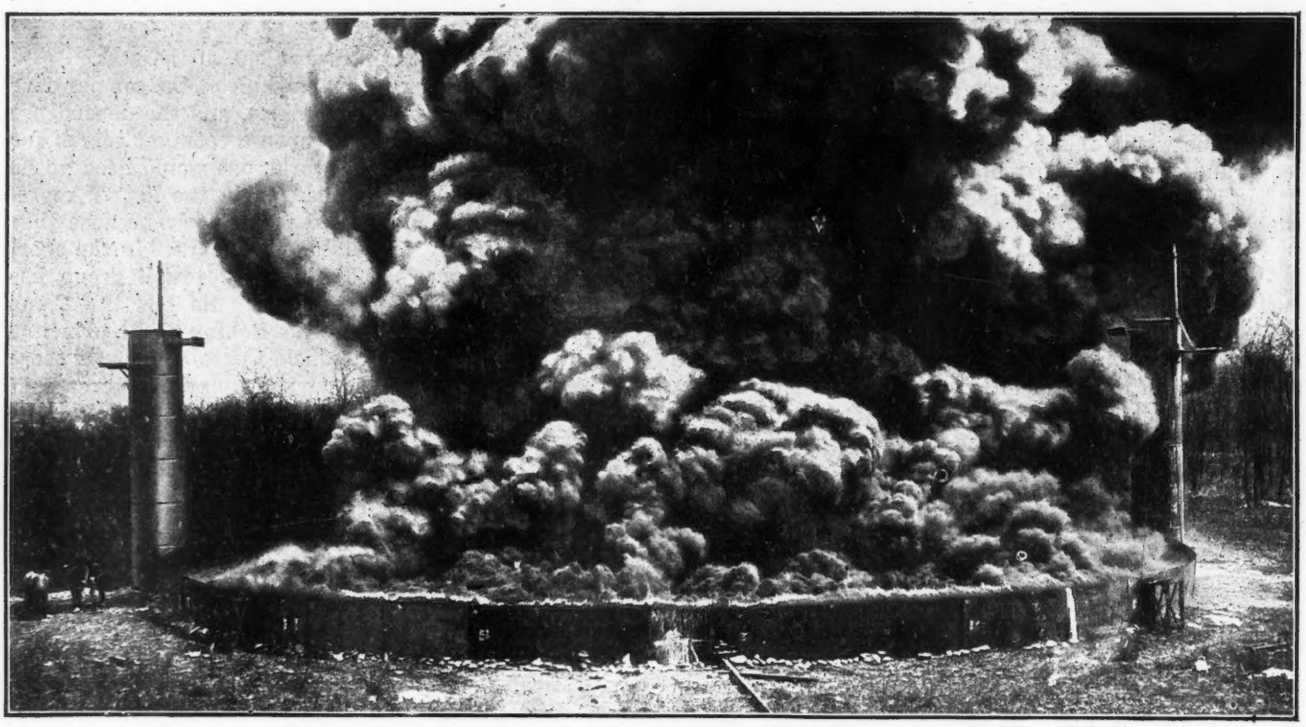
So far as I can learn, not a single radical or even important change in the processes of gold mining has taken root during the last ten years. The appliances are the same to all intents and purposes, although there has been a considerable substitution of ball mills for stamps, some improvements in drilling machines, and some changes in cyanide practice. But the ground work is the same, and results are about the same. The grand feature of the history of the business has been the progress of an economic cycle unfavorable to gold mining.

The Stollberg Mining, Lead, and Spelter Works has been obliged to permit the company's spelter plant at Dortmund to remain idle, and in view of the losses involved in present working conditions expect the closing down of further works, according to the *Ironmonger*, of April 16, 1919.

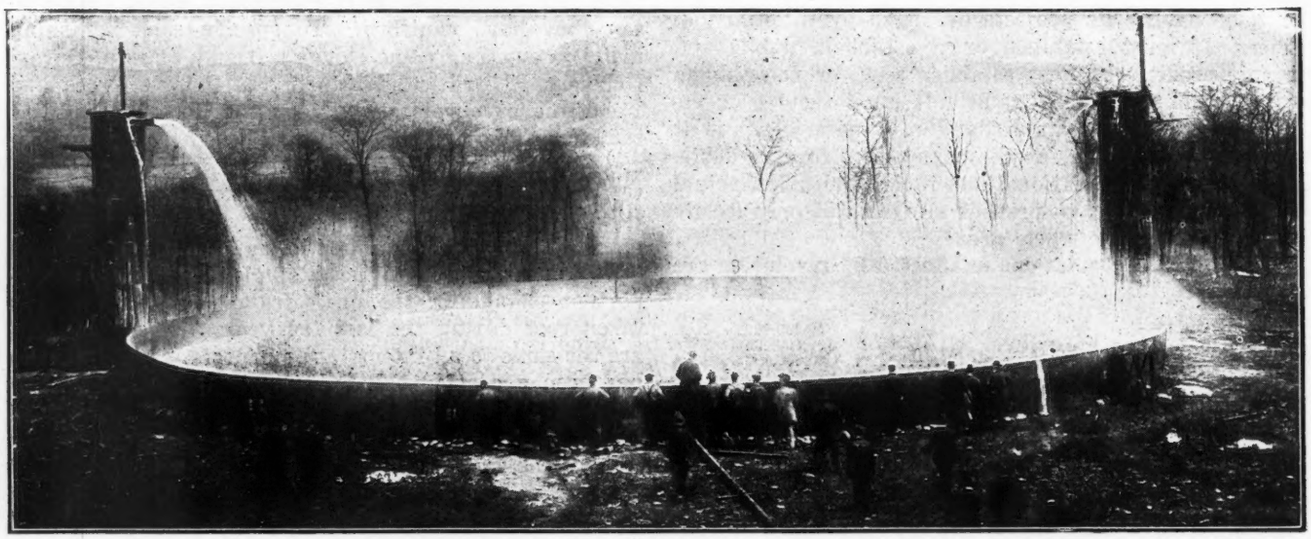
Fire Protection for Oil Tanks

Description of a Method for the Extinguishing of Disastrous Oil-Tank Fires by Using Bubbles Containing Carbonic-Acid Gas To Form a Blanket Covering on the Surface

THE storage of oil or gasoline has always been accompanied by great fire risk, owing to the difficulty in extinguishing the flames by ordinary means. The use of water results in a further spread of the blaze over a larger area on account of the well-known property of oil to float on water. The use of carbonic-acid gas is ineffective, because of the great diffusion in the atmosphere by the rising currents of air and other natural conditions. Both of these difficulties are reported as being remedied by a method which has been recently introduced into practical use. The process is based upon the principle of applying a froth or blanket of bubbles containing the carbonic-acid gas, which thereby concentrates the gas so as to make it most effective. It is also said that, by this means, not only are the flames extinguished but the smoke and fumes are also smothered.



A 55,000-BBL. TANK ON FIRE, WITH A STRONG WIND BLOWING

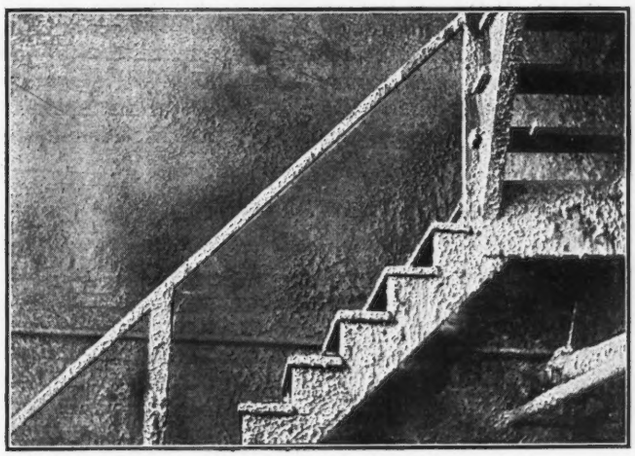


FIRE EXTINGUISHED WITHIN FORTY-EIGHT SECONDS AFTER THE APPLICATION OF CARBONIC-ACID GAS BUBBLES

Another advantage stated is the comparative dryness of the foam compared to water, as it possesses no tendency to soak into the material, which results in less

damage. The bubbles are minute in size and hold the gas efficiently. The composition of the solution used for the formation of the bubbles has not been revealed by the inventors. The froth resulting from the release of the liquid from the extinguisher is eight times in volume that of the original liquid, which therefore gives it a large area-covering capacity. The physical properties show the froth to be heavy, tenacious and lasting. Portable means for the application of the method have been provided by the use of fire pails, hand extinguishers, and portable engines. For large storage tanks permanent installations are used.

The first illustration depicts a 55,000-bbl. tank fire at its height, with a strong wind blowing, and the



CARBONIC-ACID GAS BUBBLES ADHERING TO A VERTICAL SURFACE

lower is an illustration of the same tank forty-eight seconds later, showing how the foam blanket smothered the blaze. The tank was 114 ft. in diameter, presenting 10,200 sq.ft. of surface. The method of projecting the liquid is shown by the two containers on opposite sides of the tank. According to the experiments conducted, the amount of the foam required can be calculated in accordance with the nature of the fire risk and the number of square feet of area requiring protection. The distance of discharge is a maximum of 50 ft.

The last illustration shows the great covering capacity of the liquid and its tenacity in clinging to any surface.

This system of fire protection is designed and installed by the Foamite Firefoam Co., New York, and the illustrations reproduced herewith are presented through the courtesy of that company.

United Engineering Society Honors Carnegie

At a recent meeting of the United Engineering Society the following resolution was ordered spread upon the minutes:

Andrew Carnegie's death on Aug. 11, 1919, at Lenox, Mass., brought to its close a career which greatly advanced all the engineering arts and sciences. By the introduction into the United States of the bessemer process for the production of steel, and by the establishment and development of steel plants which became the greatest in the world, he made available for engineers the most useful modern material for engineering construction. In the successful conduct of many industrial enterprises, he amassed great wealth, the possession of which he came to regard with deep seriousness as a public trusteeship. He devoted himself to the distribution of large portions of his fortune to projects for the benefit of mankind. He distributed his wealth not only in many directions, but also with the exercise of great wisdom based on careful investigation. His munificence provided large funds for the building of a home for the great national engineering societies and many associate societies. He was an honorary member of the American Institute of Mining and Metallurgical Engineers and American Society of Mechanical Engineers. He was personally known and loved by many engineers. In view of these facts, be it

Resolved, That the American Societies of Civil, Mining, Metallurgical, Mechanical and Electrical Engineers, the United Engineering Society, and the Engineers' Club herein express their condolence to the family of Mr. Carnegie and record their sincere appreciation of the great contributions of Andrew Carnegie to the advancement of engineering, and of his friendly assistance in making possible beautiful homes for the Engineering Societies and the Engineers' Club, thus fostering the spirit of unity in the profession.

Shattuck Arizona Copper Co.

The report of the Shattuck Arizona Copper Co. for the quarter ended June 30, 1919, states that development work aggregating 459 ft. was prosecuted on all levels between the 100 and 700-ft. levels, but did not result in finding any new ore. In the fire area below the 700-ft. level, bulkheads have been opened up, and air courses have been opened above the fire zone. Flooding operations have been successful in extinguishing the fire. No smoke or gas can be detected in the fire section, and the work of unwatering the mine below the 700-ft. level will soon be undertaken.

During the quarter, minor alterations were made in the lead mill, and milling tests started again June 15. The tonnage handled is approximately 250 daily. During the quarter, 981 tons of copper ore and 2,578 tons of lead ore were shipped; 2,138 tons of lead ore was smelted, and 65,148 lb. of lead was recovered. The operations for the period reviewed show a loss, exclusive of depletion, of $93,010.67.

Negligent Track Construction in Mines

BY A. L. H. STREET

To the end of minimizing danger of injuries to his employees, a mine operator is bound to construct parallel tracks in a mine far enough apart to avoid contact between cars on the two tracks, taking into consideration the likelihood of contact due to a moving car being tilted laterally by spreading or other condition of the track, or obstructions, such as rock, on the track.

This point was decided by the Utah Supreme Court in the case of Johnson *vs.* Silver King Consolidated Mining Co., 179 *Pacific Reporter*, 61, involving defendant's liability for fatal injury to a miner while he was working in a tunnel, claimed to have been caused by a car on a main track shoving a car on an adjoining side track against him.

The court recognized the rule that before an employer can be held liable in damages for injury to an employee there must be some reasonable identification of a negligent cause for which the employer is responsible. If the injury can equally well be attributed to any one of several causes, one or more of which would be the employer's fault and one or more of which would not be his fault, there can be no recovery.

Geology of Platinum Deposits—Part I

Increasing Use of the Metal in the Electrical and Chemical Industries and a Shrinkage in Output From Russia Stimulate Study of Sources—Principal Formations and Occurrences

By W. L. Uglow

Assistant Professor of Geology, University of British Columbia, Vancouver, B. C.

PLATINUM is derived primarily from two main sources—placer workings and lode deposits. Until comparatively recently the entire world's supply of the metals of the platinum group was obtained from the former source, but in the last few years valuable deposits of these metals have been discovered in certain of the Western states and in British Columbia. Though the output from these deposits is as yet small, there is reason to believe that similar occurrences will be found elsewhere, provided sufficient attention is given by prospectors to the geology of these types of platinum occurrences. This paper is a review of the salient geological features of the world's platinum deposits, which are divided into the two before-mentioned classes.

Lode Deposits

Lode deposits of platinum may be conveniently divided into several groups, based on mineralogical and lithological similarities. Such groups are not necessarily genetic. As far as is known at present, platinum occurs in lode deposits in two forms, as native platinum or as sperrylite. In the former case it is found associated with characteristic rock types the world over. It is usually alloyed with palladium, iridium, osmium, and other members of the platinum group, and is accompanied by chromite. Sperrylite, the arsenide of platinum, $PtAs_2$, occurs in many types of deposits, but generally in those associated with basic igneous rocks. It is usually accompanied by palladium in some form not yet determined, and frequently by the sulphides of copper and iron. In many cases platinum occurs in ore deposits in such small amounts that the character of the mineral has not been recognized, but it is believed to be either native metal or the arsenide.

The source of the platinum metals in many placer workings has been traced to lode deposits containing the metals in the native form, but in no case yet reported have these lode deposits been successfully mined and the precious metals recovered. On the other hand, deposits containing platinum in the form of sperrylite have been mined on a commercial scale, but no instance is recorded in which deposits of this type have given rise to placers of commercial value. Platinum and other metals of the group have been detected in the following types of deposits:

Dunite and Serpentine

These are the types of deposits in which the platinum metals are known to occur in the form of native metals or alloys. Few serious attempts have been made to recover the metals from these sources, although in some cases such deposits have been tested and results of an interesting scientific nature obtained.

In many places where platinum metals have been derived from placer workings, careful search has revealed the presence of dunite, serpentine, or related types within the drainage basins of the river systems which carry the precious metals, and analyses of these rocks have demonstrated the presence of platinum. Rocks of this type consist essentially of olivine, serpentine, pyroxene, chromite, and magnetite, with their alteration products, magnesite, hematite, limonite, and kaolin. They are the characteristic home of chromite; and the frequent association of the latter mineral with platinum in placer ground points to the origin of the precious metal in those rocks in which chromite most commonly occurs.

Sources of Platinum

A few of the most important districts containing deposits of this type are mentioned below:

Ural Mountains, Russia—The streams in Russia whose drainage basins have produced the greater part of the world's platinum cross during their courses large areas of dunite and serpentine in which grains of platinum have been recognized. Experiments have been carried on by V. N. Chorzhevsky[1] with the dunite of the Nizhni-Tagilsk district in the Urals, which occupies about twelve square miles, in an endeavor to concentrate the contents of platinum metals into a recoverable form. The method adopted was to grind the rock finely and collect the chromite concentrates by tabling. Platinum was leached from these concentrates. A representative sample of the concentrates derived from 9,720 lb. of material gave, after being cleared of all visible metal, 200 oz. of platinum; and the gray fines, consisting of tailings and undecomposed dunite, assayed 11 gm. (about $\frac{1}{3}$ oz.) of platinum from 3,600 lb. of material.

Tulameen District, British Columbia, Canada—Large dike-like masses of dunite considerably altered to serpentine and containing lenticular masses of chromite are found in this area, cutting older sediments and volcanics, and associated with pyroxenite and augite syenite. Several investigations of these dunites have been made in recent years with regard to their platinum content, but no attempts at a commercial extraction have been undertaken.

The best results were obtained from the rock in which alteration had taken place to serpentine or in which the rock was rich in chromite[2]. Assays of serpentine veins in peridotite yielded platinum varying in amounts from a trace up to nearly two ounces to the ton, but this distribution was found to be irregular. Masses of chromite also gave good results, which varied up to $\frac{1}{2}$ oz. to the ton. Here again the distribution was found to be uneven.

Ronda Mountains, Spain[3]—In this new platinum district of southern Spain, which stretches along the Mediterranean coast eastward from Gibraltar, the origin of

[1] *Mineral Industry*, 1916, p. 596.
[2] U. S. Geol. Surv., *Bull.* 193, 1901, p. 48. Geol. Surv. Can., *Memoirs* 26, 1913, pp. 153-154.
[3] U. S. Geol. Surv., "Mineral Reserves of the U. S., 1915," p. 147.

the extensive platinum placers is said to be in central masses of dunite and serpentine, with which are associated small bodies of chromite. Platinum has been identified, associated with the chromite, scattered in small particles through the mass; and investigations have recently been made by the Spanish government to determine the commercial value of this lode deposit.

United States of Colombia—Specks of platinum have been found in olivine-bearing rocks of the Choco district of Colombia, from which a large part of the output of placer platinum is being derived.[4]

Tasmania—The platinum content of the Tasmanian placers has been traced to a ledge of sheared serpentine which is found to contain minute particles of platinum.[5]

California—It is believed that the ultimate source of the platinum of California gold placers is in the serpentine and the olivine-bearing rocks of the Sierra Nevada and other ranges, which are in portions of the drainage basins of the streams.[6]

NICKELIFEROUS DEPOSITS IN BASIC IGNEOUS ROCKS, AS GABBRO, OLIVINE GABBRO, NORITE, PERIDOTITE, SERPENTINE

In Sudbury, Ontario, Canada, the following important occurrences are summarized:

Vermilion Mine[7]—The arsenide of platinum, sperrylite, was identified by Wells and Penfield in the ore of this mine in 1889. It is a silvery-white metallic mineral, occurring in minute cubes apparently associated with the chalcopyrite-rich portions of the ore. The deposit consists of a number of small veins and irregular bodies of ore from a few inches to fifteen feet in diameter, enclosed in greenstone, quartzite, and norite. The minerals of the ore deposit are pyrrhotite (nickeliferous), chalcopyrite, bornite, chalcocite, native copper, cassiterite, gold, millerite (NiS), polydymite (Ni_3S_3), sperrylite, and quartz. Platinum and palladium both occur, the latter in the greater amount. The valuable minerals were found both in the gossan and in the unaltered ore. A. P. Coleman[8] states that 198.28 tons of ore mined in 1902 carried the following amounts of precious metals per ton: 4 oz. palladium, ½ oz. platinum, ⅓ oz. gold, 4 oz. silver. The figures are far above the average.

Nickel-Copper Ores of the Main Sudbury Basin—Platinum and palladium have been known to occur in these nickel-copper ores for several years, but whether the platinum is present as sperrylite, as in the case of the Vermilion mine, has not been determined. The highest platinum returns have been derived from the copper-rich portions, whereas the palladium seems to favor the nickel-rich portions of the deposits. These orebodies occur as marginal differentiation products at the base of a thick sill of intrusive norite, consisting in the main of augite, hypersthene, and labradorite. The ore-bearing minerals are chiefly pentlandite, pyrrhotite, and chalcopyrite, with small amounts of polydymite.

Until recently the only information available as to the actual content of platinum metals in these ores was derived from the analysis of nickel-copper mattes. The International Nickel Co. reported the average content of precious metals per ton of matte for three years ending in 1915 as follows:[9]

	Ounces per Ton		Ounces per Ton
Platinum	0.10	Gold	0 05
Palladium	0.15	Silver	1.75

Assays of roasted mattes gave results as follows:[9]

	Ounces per Ton		Ounces per Ton
Platinum	0.1235–0.988	Gold	0.027–0.256
Palladium	0.197 –0.984	Silver	1.84 –6.156
Iridium	0.046 –0.065		

From such data as these it was estimated that one short ton of Sudbury nickel-copper ore contained.[10]

	Ounces		Ounces
Platinum	0.01	Silver	0.2
Gold	0.01	Palladium	Not given

The analyses given in Table I have recently been published by Roberts and Longyear.[11] They are the only figures available showing the actual amounts of the platinum metals in specific samples of ore. The samples were taken by diamond drilling through large undeveloped orebodies.

The average content of these sixteen analyses is 0.0068 oz. of platinum metals per ton.

The ore in the Alexo Mine, Ontario, consists chiefly of nickeliferous pyrrhotite, chalcopyrite and pentlandite in a gangue of altered peridotite and serpentine. In 1915 a shipment of between 5,000 and 6,000 tons of this ore showed 0.03 oz. of platinum and palladium per ton.[12]

TABLE I. ANALYSES OF COMPOSITE ORE SAMPLES FROM DIAMOND-DRILL HOLES

Hole No.	23	24	25	85	115	115	144	146	193	302	303	304	306	307	308	310
Cu, per cent	1.45	1.27	0.87	1.59	0.98	0.61	0.90	0.74	0.80	1.56	1.20	1.79	1.31	0.91	0.90	0.88
Ni, per cent	1.45	1.79	1.19	1.55	1.35	2.97	1.72	1.96	1.14	1.43	2.57	2.22	2.41	2.60	2.75	2.15
Ag, oz. per ton	0.20	1.00	0.20	0.30	0.15	0.04	0.19	0.20	0.30	0.16	Tr	0.22	0.10	0.20	0.13	0.18
Au, oz. per ton	0.012	0.21	0.014	0.002	0.007	0.004	0.007	0.005	0.003	0.013	0.03	0.008	0.023	0.007	0.003	0.007
Pt metals, oz. per ton	0.004	0.02	0.006	0.004	0.005	0.004	0.003	0.009	0.003	0.007	0.01	0.006	0.013	0.004	0.004	0.007

In the Great Eastern and Key West Mines, Clarke County, Nev.,[13] large basic dikes 10 to 50 ft. wide cut an older series of granitic gneisses, interlaminated with green and black schists, and associated with pegmatite and aplite. The Great Eastern dike is essentially an enstatite-mica picrite, consisting of augite, olivine, biotite, enstatite, with accessory magnetite, pyrrhotite, and chalcopyrite. Assays from portions of the dike are given in Table II.

TABLE II. ASSAYS AND ANALYSES OF PORTIONS OF THE GREAT EASTERN DIKE

	1	2	3
Cu	.....	1.5%	2.01%
Ni	0.26%	0.9%	5.38%
Pt Metals	Tr.	0.25 oz.	0.17 oz.
Co	0.04%	.....	.....
Au	.....	.....	Trace
Ag	.....	.....	Trace

1 Made by U. S. Geological Survey; 2 made by R. H. Officer & Co., Salt Lake; 3 made by Ledoux & Co., New York.

Another portion of the Great Eastern dike proved to be a fresh holocrystalline hornblendite, showing no signs of metallic contents, but giving a trace of plati-

[4]U. S. Geol. Surv., "Mineral Resources of the U. S., 1913," p. 455.
[5]*Mineral Industry*, 1914, p. 609.
[6]U. S. Geol. Surv., "Mineral Resources of the U. S., 1916," p. 9.
[7]Royal Ontario Nickel Commission, Report, 1917, pp. 41, 155.
[8]Mines Branch, Dept. of Mines, Canada, "The Nickel Industry," 1913, p. 45.
[9]Royal Ontario Nickel Commission Report, 1917, pp. 484, 486.
[10]Ibid, Appendix, p. 39.
[11]*Trans.* Can. Min. Inst., 1918, p. 99.
[12]Royal Ontario Nickel Commission, Report, 1917, p. 485.
[13]U. S. Geol. Surv., *Bull.* 430, pp. 192-199. *Mineral Industry*, 1909, p. 602.

num. The Key West dike, which is believed to be a continuation of the above, is much hydrometamorphosed, and fresh portions were not available for study. Small amounts of pyrrhotite and considerable pyrite are present. Assays and analyses are given in Table III.

TABLE III. ASSAYS AND ANALYSES OF PORTIONS OF KEY WEST DIKE

	1	2	3	4	5
Cu	.....	.....	.....	2.30%	3.50%
Ni	1.47%	5.6%	4.66%	1.79%	1.86%
Co	.....	.....	.....	0.08%	.....
Pt Metals	0.1 oz.	0.12 oz.	0.55 oz.	0.13 oz.	0.15 oz
Au	Nil	Nil	Trace	Trace	Trace
Ag	Nil	Nil	Nil	Trace	0.35 oz.

1 From decomposed dike near surface; 2 from specimen showing high percentage of sulphides; 3 from picked sample of ore from dump, which came from orebody between levels 2 and 3; 4 represents carload shipment of 91,600 lb. of ore assayed by the North American Lead Co.; 5 from same shipment assayed by Ledoux & Co.

From the nickeliferous pyrrhotite of the Insizwa Range, Griqualand, South Africa, platinum may be commercially extracted.

The ore contains:[14] Cu, from 1.5 to 20 per cent, with an average of 4 per cent; Ni, from 1.5 to 10 per cent, with an average of 4 per cent; Pt, between 2 and 3 pwt. per ton. Some samples show several ounces per ton. Norwegian nickel ores yield about 50c. per ton in platinum and palladium.[15] One large parcel of nickel ore from Tasmania is stated to have contained 0.06 oz. platinum per ton.[16] Platinum occurs in a copper-nickel gossan at Mulga Creek Springs, near Broken Hill, N. S. W., associated with gabbro and decomposed gneisses and schists.[17]

Dike-Like Masses of Pyroxenite, Hornblendite, or Diorite, With or Without Olivine

This type of deposit differs from that of the preceding group chiefly in the absence of nickeliferous pyrrhotite. Platinum is present in one of the occurrences in the form of sperrylite, and this mineral may be the chief platinum carrier in deposits of this class. Chalcopyrite is usually present. According to the available descriptions the rocks containing the platinum do not occur in the shape of large irregular intrusions, but tend to take on an elongate form, simulating dikes. The following are specific occurrences:

Rambler Mine, Near Laramie, Wyo.[18]—Basic dikes, consisting of green hornblende, brown biotite, and labradorite or bytownite feldspar, and accessory apatite, pyrite, and magnetite, and called diorite by J. F. Kemp, intrude a country of granite gneiss with some quartzite and massive granite. Near the Rambler shaft the rock is a hornblende peridotite, consisting of green hornblende, olivine, and hyperstnene. Outcrops are not common, as the area is covered with a loose wash. These dikes appear to have been originally charged with sulphides of iron and copper, and with some platinum minerals, and to have undergone considerable hydrometamorphism. Covellite (CuS), chalcocite (Cu_2S) and chalcopyrite ($CuFeS_2$) seem to replace the diorite, and the outcrop consists of limonite, azurite, malachite, and kaolin.

Sperrylite, arsenite of platinum, has been separated from the covellite by Professor Penfield, and seems to constitute the source of the platinum. During 1917, about 350 tons of concentrates were refined, which carried considerable palladium and about one-third as much platinum. It is reported that recent work at greater depth in the mine has disclosed a new orebody that carried both platinum and palladium in workable amounts.[19]

Franklin Camp, Grand Forks Mining Division, British Columbia—The presence of platinum was detected in the "Black Lead" of the Franklin camp in 1918. This rock is described as a shonkinite-pyroxenite, and is a marginal phase of the augite syenite intrusion. It is black to dark green in color, and a microscopic measurement of the relative amounts of constituent minerals in a typical specimen gave the following results: Augite, 73.13 per cent; orthoclase and microcline, 17.06 per cent; hornblende, 1.47 per cent; magnetite, 6.06 per cent. Accessory minerals consist of titanite, pyrite, chalcopyrite, bornite, and apatite.[20] Various portions of this "Black Lead" were sampled by the Canadian Munition Resources Commission and the Geological Survey of Canada in 1918, and the assays, given in Table IV, were obtained.[21]

TABLE IV. PLATINUM ASSAYS OF "BLACK LEAD"

Property	No. of Samples	Ounces of Platinum Metals per Ton
Maple Leaf	3	0.15, 0.17, 0.38
Lucky Jack	3	0.04, 0.06, 0.08
Mountain Lion	2	0.02, 0.09
Golden Age	1	0.06
Averill Group	2	0.09, 0.09
Buffalo	2	0.08, 0.19
Ottawa	1	0.06
Columbia	1	0.04

A sample of pure chalcopyrite taken from the "Black Lead" by J. J. O'Neill for the Geological Survey of Canada assayed 0.38 oz. of platinum metals per ton. Most of the samples represented minable widths and were taken from portions of the lead which showed small amounts of metallic minerals.[22]

Tulameen District, British Columbia—Platinum has been detected by assay in samples from pyroxenite dikes, cutting through the peridotites of Olivine Mountain. The assays showed from a trace to 0.15 oz. per ton.[23]

Walhalla Copper Mine, Victoria—Platinum occurs here in a lode formation in a hornblende diorite with chalcopyrite, gold, and silver. The ore contains from 0.1375 to 0.392 oz. of platinum per ton, the payable minimum being about 0.017 oz. per ton.[24]

La Plata Mine, Liberty Hill District, Nevada County, Cal.—Samples of platinum-bearing ore from this mine were received by the U. S. Geological Survey in 1916. The orebody is reported to occur in gabbro, west of the main serpentine area, but outcrops of serpentine rich in chromite and olivine are said to lie near the vein. Associated with the ore are pyrrhotite and chalcopyrite in a greenish siliceous gangue.[25]

Other Occurrences—At the Thompson River copper mine, Victoria, platinum is found in a hornblende rock rich in chalcopyrite.[26] At the Goodro Mine, Prince of Wales Island, Alaska, platinum occurs in diorite, associated with bornite, chalcopyrite and chalcocite.

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[14]Inst. Min. & Met., *Bull.* 147, Dec. 14, 1916.
[15]Royal Ontario Nickel Commission, Report, 1917, p. 485.
[16]Ibid, p. 486.
[17]New South Wales Geol. Surv. Rec., Vol. 8, Part IV, 1909, pp. 287-292.
[18]U. S. Geol. Surv. "Mineral Resources of the U. S., 1902," pp. 244-250.
[19]U. S. Geol. Surv., "Mineral Resources of the U. S., 1917," p. 20.
[20]Geol. Surv. Can., *Memoir* 56, 1915.
[21]"Western Can. Min. Eng. & Contracting," Jan., 1919.
[22]Geol. Surv. Can.
[23]U. S. Geol. Surv., *Bull.* 193, 1901, p. 49.
[24]*Mineral Industry*, 1917, p. 543.
[25]U. S. Geol. Surv., "Mineral Resources of the U. S., 1916," p. 8
[26]*Mineral Industry*, 1917, p. 543.

Boss Mine, Yellow Pine Mining District, Nevada—In 1914 platinum and palladium were found in certain ores in the Yellow Pine Mining District, Nevada. The ore deposit on the Boss claim was discovered about thirty years ago, having been located for copper, the presence of which is plainly indicated by chrysocolla and other oxidized minerals. The deposit consists of a fine-grained quartz mass, which in the main replaces irregularly the Carboniferous dolomites along a series of vertical fractures. A small mass or dike of granite porphyry intrudes the dolomite about 600 ft. north of the mine, but no basic intrusives occur; in fact, none are known to occur in the Yellow Pine Mining District, is the most productive lead-zinc district in Nevada.

The orebodies so far developed may be briefly described as oxidized copper shoots and gold-platinum-palladium shoots. The copper ores consist largely of chrysocolla and other oxidized compounds, but these ores carry only minor quantities of the precious metals. The gold-platinum-palladium shoots consist of a fine-grained quartzose ore containing a small quantity of a bismuth-bearing variety of the rare mineral plumbojarosite (a hydrous sulphate of iron and lead). The principal oreshoot disclosed by the present workings forms an irregular pipe pitching at a low angle to the northeast. In this shoot at the time of visit from 1,000 to 2,000 tons of ore had been developed, averaging in ounces per ton, Au, 3.46; Ag, 6.4; Pt, 0.70; Pd, 3.38. The precious metals are associated especially with the plumbojarosite; pockets of the pure mineral carry 100 oz. or more of platinum and palladium and several hundred ounces of gold per ton. This great richness points to a concentration of the precious metals in the oxidized ore by surface solutions, so that in depth the pockets of extremely high-grade ore, such as are now being extracted, will give place to ore of moderate grade. The only sulphide so far found in the mine is chalcocite, and this is probably of secondary origin."[27]

According to *Mineral Industry* for 1914, plumbojarosite is a lead-potash-iron alum, $Pb(Fe(OH)_2)_6(SO_4)_4$. This mineral probably originated from some such mineral as bournonite, which has oxidized in the presence of potash. Plumbojarosite is a yellowish green earthy mass, noticeably heavy and inclined to form soft lumps. The average amount of precious metals recovered from one ton of ore is, according to this authority, as follows: Cu, 80 pounds; Au, 31.1 gm.; Ag. 62.2 gm.; Pt and Pd, 46.65 gm. Such ore has a valuation of over $250 per ton. It is said that the platinum ore has been developed to a vertical depth of 1,500 or 2,000 ft. on the dip of the vein.[28]

During 1917, there were recovered 107 oz. of platinum and 400 oz. of palladium, which was derived from 442.54 tons of copper-gold-platinum ore.[29] A sample of high-grade ore sent to Ledoux & Co. assayed as follows:[30] Au, 111; Pt, 99.08; Pd, 16 oz. per ton. This occurrence is exceedingly interesting, on account of the absence of the association with basic igneous rocks, and also because of the possibility of the plumbojarosite being an alteration product from some such mineral as bournonite. See "Associations with Tetrahedrite."[32]

Roll Call Mining Co., Near Villa Grove, Colorado[31]—Assays of material from a two-foot vein, 410 ft. from the tunnel mouth and 1400 ft. beneath the surface workings, gave Au, 3.20 oz.; Pt, 5.09 oz.; Ag, 3.05 oz. per ton; Cu, 3.5 per cent. This ore is worth over $500 per ton. Details as to the geology of the deposit are not available.

Associated With Tetrahedrite, Bournonite, Malachite, Arsenopyrite—At Guadalcanal,[32] a few miles northeast of the Rio Tinto District, Spain, platinum occurs in ore resembling tetrahedrite in a gangue of calcite, barite, and quartz in a country rock of mica schist. The amount of the platinum varies between a trace and 10 per cent. Platinum occurs in tetrahedrite in metamorphic limestone, above Chatelard,[33] in the Valle du Drac, Hautes Alpes. The gangue is dolomite, quartz, and barite. At St. Arey, near La Mure (Isere), France,[34] platinum occurs in bournonite, in dolomite, and altered limestone. Near Presles in Savoy, France[35], platinum occurs in argentiferous tetrahedrite and malachite. Platinum is found in a quartz vein with gold and arsenopyrite in the Lucknow and Alma auriferous reefs at Gympie, New South Wales.[36]

GOLD-QUARTZ VEINS

A picked sample of ore from the shaft of the Northern Manitoba and Development Co.,[37] near The Pas, Manitoba, gave $49 in gold and $17 in platinum per ton. Platinum is also reported from McCafferty's Prospect[38] about five miles from the above locality. Five assays of ore from the Quinn claims near the Croesus mine, Munro Township, Ontario,[39] gave platinum values between $180 and $1,800 per ton (with a value of $40 to $50 per oz. for platinum). Platinum has been found in a gold-bearing quartz vein on the Mother Lode claim, Burnt Basin, B. C., of the Contact Consolidated Mines, Ltd.[40] Samples of ore sent to Baker & Co., Newark, N. J., gave from a trace to 0.25 oz. of platinum per ton. The quartz carried free gold, chalcopyrite, pyrite, galena, sphalerite, molybdenite. Other occurrences have been reported from Beresovsk mines, Ural Mountains, Russia,[41] from the Esperança veins, Minas Geraes, Brazil[42]; from a vein near Boyertown, Pa.,[43] from the Choco district, Colombia[44] and from the Thames and Terenakau Rivers, New Zealand.[45]

(To be continued)

Two Types of Classifiers are in use at the Washoe Reduction Works of the Anaconda Copper Mining Co., the hydraulic hindered settling type, for partially desliming the feed to Wilfley tables, and mechanical classifiers, for separation of the coarse and finer particles in the trunnion discharge of the regrind conical mills. The hydraulic classifier used is the No. 7 Anaconda deslimer and its operation has proved satisfactory. For the mechanical separation of coarse and fine particles in the conical-mill discharge, the Dorr classifier has met all requirements.

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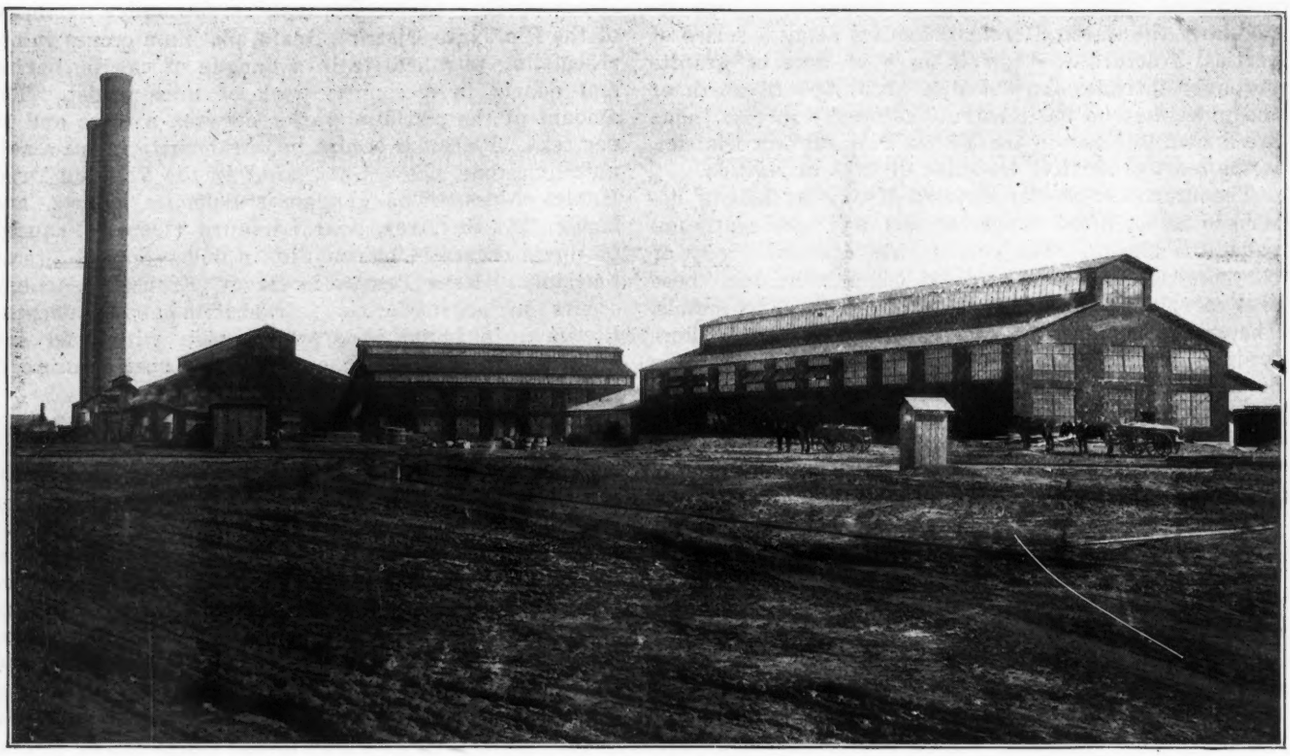
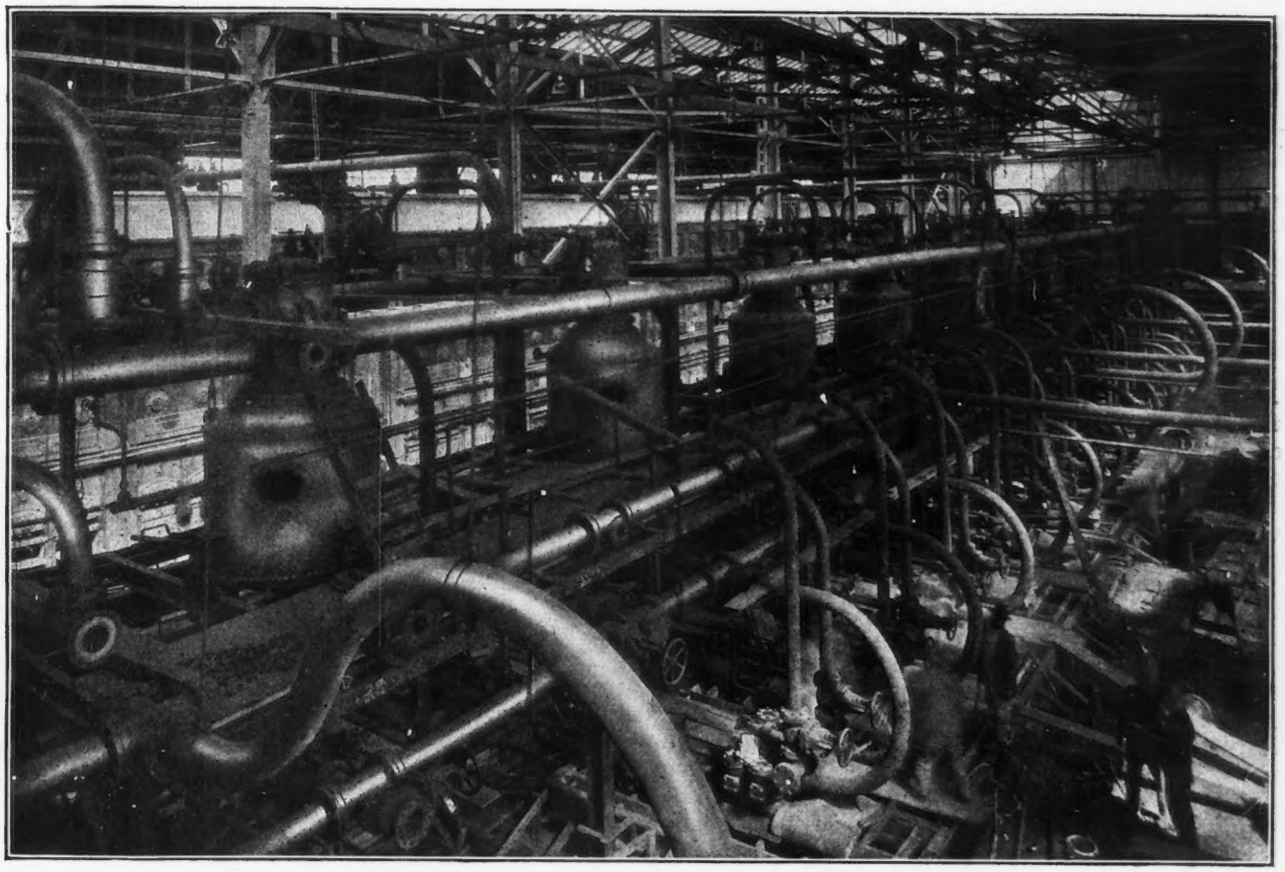
[27]U. S. Geol. Surv., *Bull.* 620, 1915, pp. 1,18.
[28]U. S. Geol. Surv., "Mineral Resources of the U. S., 1915," p. 144.
[29]U. S. Geol. Surv., "Mineral Resources of the U. S., 1917," p. 20.
[30]U. S. Geol. Surv., "Mineral Resources of the U. S., 1913," p. 450.
[31]*Mineral Industry*, 1917, p. 541; *Salt Lake Min. Rev.*, Mar. 15, 1917.
[32]U. S. Geol. Surv., *Bull.* 193, 1901, p. 81.
[33]U. S. Geol. Surv., *Bull.* 193, 1901, p. 66
[34]U. S. Geol. Surv., *Bull.* 193, 1901, p. 66.
[35]U. S. Geol. Surv., *Bull.* 193, 1901, p. 66.
[36]*Mineral Industry*, 1917, p. 543.
[37]*Can. Min. Journ.*, Nov. 15, 1916.
[38]Ibid.
[39]*Eng. & Min. Journ.*, Vol. 101, Jan. 15, 1916, p. 161; *Min. & Sci. Press*, Jan. 22, 1916.
[40]Geol. Surv. Can., Summ. Rep., 1901.
[41]J. A. Phillips, "Ore Deposits," p. 671.
[42]U. S. Geol. Surv., *Bull.* 193, 1901, pp. 60-61.
[43]U. S. Geol. Surv., *Bull.* 193, 1901, p. 59.
[44]U. S. Geol. Surv., *Bull.* 193, 1901, p. 65.
[45]*Mineral Industry*, 1917, p. 543; Ibid, 1913, p. 604.

The Texas Gulf Sulphur Co.

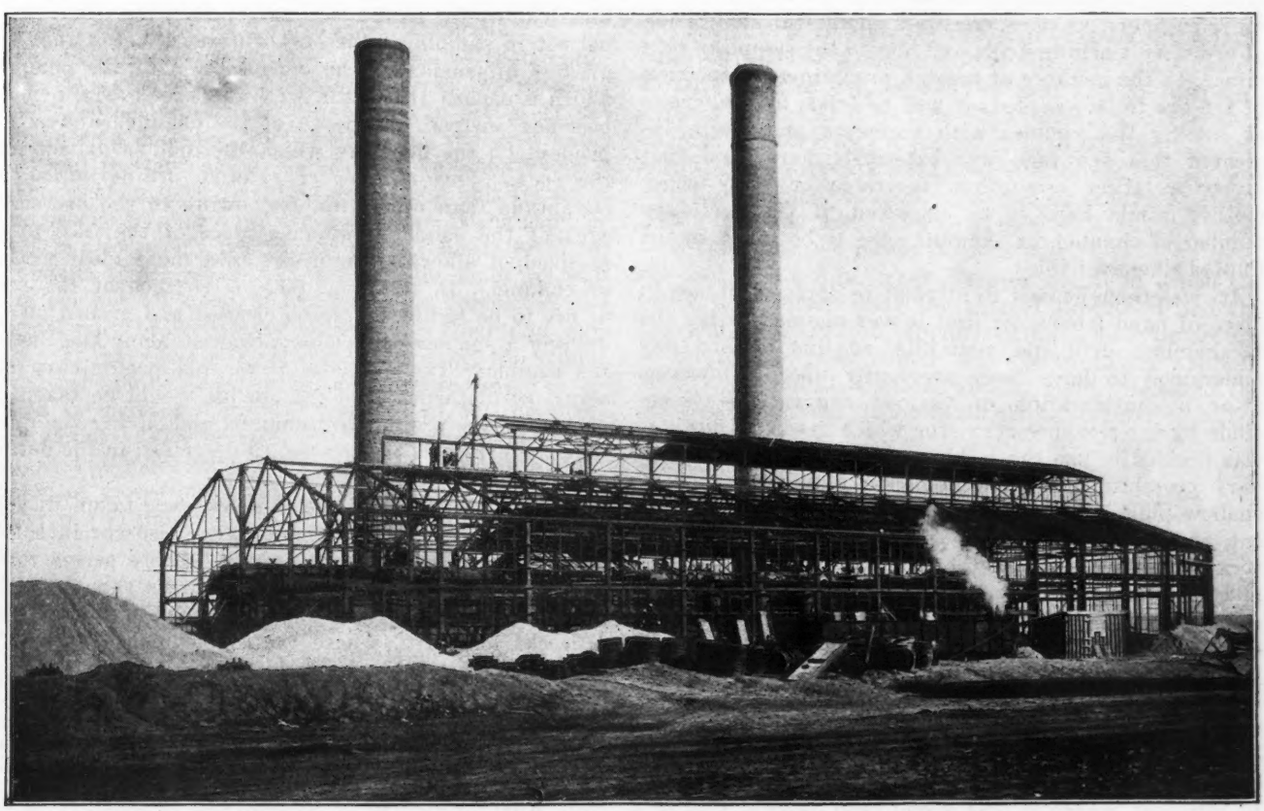


STEAM PLANT, WAREHOUSE, AND SHOPS OF THE TEXAS GULF SULPHUR CO.

GULF, MATAGORDA COUNTY, TEXAS, SHOWING HOUSES OF TEXAS GULF SULPHUR CO.



INTERIOR OF STEAM PLANT, SHOWING HEATERS AT TEXAS GULF SULPHUR CO. PLANT



TEXAS GULF SULPHUR CO. PLANT AT GULF, MATAGORDA COUNTY, TEXAS, UNDER CONSTRUCTION

Application of Air Drills to Mine Sampling

Making Narrow, Deep Channels by Drilling a Row of Shallow Holes and Cutting Out the Intervening Ribs Results in the Saving of Both Labor and Time— Jackhammers With Ordinary Crossbits Used

BY JOHN H. EGGERS
Mining Engineer

AT THE suggestion of several well-known mining engineers who witnessed a part of the operation of cutting the samples, and all of the results of the sampling, a record of the operations is here presented. Some years ago, a short article appeared in one of the mining periodicals which described a method of taking samples with the non-rotating jackhammer, or plugger type of machine drills, with which moil bits were used. In the instance at hand, the work was done with ordinary jackhammer drills and also, though to a less extent, with the stoping drill, using both the regular cross and Carr bits.

Special small non-rotating jackhammer or plugger type of jackhammer drills and moil bits should be of decided advantage in place of hammers and moils in cutting out channel samples, but such special equipment would probably not be available at a property under investigation, whereas the method herein described makes use of the jackhammer and stoping drills, which are more likely to be found as part of the mine equipment.

This method of sampling has probably been used by others, but it is not known that any articles have been published about it, and this description is offered in the belief that it may contain information of service to other enginers, as it represents a successful application of ordinary machine drills and bits to the sampling of a mine. In the instance at hand, a preliminary inspection of the ore to be sampled, as well as trials by two crews at cutting the samples with hammers and moils, indicated that the rock was extremely hard, and that either a larger crew than desirable or some other method would have to be employed, if the necessary number of channel-cut samples were to be taken in the limited time available.

It was thought best to attempt to apply machines in place of hand labor. At first it was planned to try the jackhammer drill and moil bits, as this method was understood to have been previously used. However, after a consideration of various suggestions (some made by the working crew, for which credit is due), it was decided to use the jackhammer drills and the ordinary crossbits; the plan being to drill two rows of shallow plug holes along the line of the channel to be cut, and to then chip, moil, and break out the undrilled rock remaining between the holes, saving the drillings and the chips as the sample.

As the work progressed, it became apparent that one row of holes drilled sufficiently deep (several inches) would be adequate for the sample, and also that, if the holes were drilled closely enough, the rock between the holes in the row would break out during the drilling. This served to shorten the time required in taking the samples, for one row of holes was found to be sufficient, where at first it had been thought that two rows would be required. It also saved the labor and time necessary to cut out the rock that remained between the two rows of holes.

The channel cut by drilling one row of holes was rather irregular in outline, being the full width of the drill bit opposite the center of each hole, but only about two-thirds of this width between the holes, so that, instead of being represented by two parallel straight lines, the sides of the channel were represented by two wavy lines that diverged opposite the holes and converged between the holes. This resulted from the shoulders or corners which were left between the holes, and which were difficult to drill out.

The first cuts were greatly improved upon, when, as the men became accustomed to the work, it was found that by moving the drill and bit from one side to the other, or back and forth along the line of the sample, a channel could be cut out that would be uniform and regular. The final result was a channel, slightly wider than the drill bit, that could be cut to any desired length and depth. The latter dimension would be determined by the character of the ore, and by the requirements of the sampling, and other considerations.

CHANNEL CUT IS NARROW AND DEEP

The channel cut as described may be made practically identical, as far as dimensions go, with the usual channel cut in sampling; the only difference being that the greater dimension of the cross-section of the channel, which is usually the width (of from three to six inches), becomes, instead, the depth of the channel, and is dependent on the depth to which the drill is driven into the rock. This may be considered, ordinarily, as an advantage than otherwise, for, owing to the decreased area of the usual irregular surface of the face to be sampled, it allows an approach to a more ideal section or channel. In fact, the face or surface of the rock or ore to be sampled may be cleaned and evened off by drilling a shallow preliminary channel along the line of the sample. The drillings from this preliminary cut would be discarded, and the sample would be taken by deepening the preliminary channel and saving the drillings therefrom as the sample, as described in the details which follow.

Though nearly all of the samples were taken in very hard ore or rock, some samples were also cut in softer material with satisfactory results. There seems to be no reason why the use of machine drills should not be possible in the sampling of many types and structures of rocks and ores, where the employment of the apparatus is justifiable from an economic point of view, as the practice is dependent largely on the accessibility of the air line, hose and machine drills, and the comparative time required to make the necessary connections. It is obvious that it is of more advantage in a place where a number of samples can be taken from one air-line connection than where the entire apparatus

must be moved and a new connection made for each sample cut.

Though the samples taken in the work described were comparatively small, they were sufficiently large for the purpose at hand, and it is apparent that much larger samples can be cut, with equal and possibly greater advantage, when desired. The use of the machine drills in this particular examination resulted in the securing of a greater number of necessary samples, at less cost per sample, and with a greater degree of accuracy, than would have been possible had hammers and moils been used, and it is believed that these advantages will hold in a large number of examinations, particularly where the ore to be sampled is very hard, and much time and labor are required in cutting each sample.

Personal Equation Is Largely Eliminated

An additional advantage is to be found in that, as the work of the crew becomes largely mechanical, the matter of the personal equation and its possible effects on the sample is largely eliminated. It was also found that practically all of the chips and drillings cut from the channel were saved in the sampling, whereas it is not uncommon, when using hammers and moils, and catching the chips in a candle box, to lose at least a small percentage.

Possibly the greatest advantage is that the method permits the use of power drills instead of hard manual labor. It is significant that though machinery has been adopted for use over a wide range of operations about the mines, most of the work of sampling is still done by manual labor, and there is little reason why the advantages in the use of machinery should not, at least to a considerable degree, be also applicable to this work. Modifications in the apparatus and method would undoubtedly be necessary under varying conditions, as in any method of sampling, but the process and equipment described can often be used to good advantage.

The same procedure applies to the use of the stoping drills in taking overhead samples across the roofs of levels or other workings. However, the action of the stoping drill does not allow of moving the drill backward and forward along the channel, as when using a jackhammer in taking a face sample. For this reason it is necessary to plug holes along the line of the sample; but it is also readily possible to cut out the intervening or undrilled rock remaining between the holes, as well as to cut out all corners, so that, when completed, the channel may be considered as fairly regular and uniform. If the channel is cut sufficiently deep, the sample secured should be an accurate one. Greater speed is obtained in using the stoping machine in cutting overhead samples than in using the jackhammer on a face sample, but more care is required to prevent the inclusion of pieces of extraneous ore or rock that might fall from the roof.

Sampling Details

The details of the use of the machine drills in sampling in this instance are more fully described in the following paragraphs. The accumulated muck or dust sticking on the walls and roofs of the workings to be sampled was first cleaned off with water under pressure, and also with a broom, and all loose pieces of rock or ore were knocked off. The thorough cleaning of the walls or places before sampling is advisable, not only because the accumulated muck along the channel does not belong with the material to be sampled, but because it is generally necessary at the completion of the sample to brush off the drillings and chips from the channel that fall and stick or hang on to the slightly inclined portions of the rough wall below the channel. Under such conditions it is of advantage to the accuracy of the sample to have had a clean wall in the beginning, so that any foreign material will not become mixed with the sample.

The portion of the face to be sampled may be further cleaned by drilling a preliminary channel, say about half an inch deep. In the work described the preliminary channel was not cut, owing to the hardness of the rock and the limited time available, but it would be advisable under certain conditions.

Two pieces of canvas, each about six by eight feet, were then laid down on the floor of the level, in such a manner that one piece overlapped the other several inches. Two pieces were used instead of one large piece of canvas, because they are more easily handled. The area of the canvas should be sufficient so that all of the drillings, say from a 5-ft. sample, can be caught on it, thus avoiding any loss of time that would otherwise result if the canvas had to be moved before the completion of the cutting of the sample.

In the case of the wall samples, the edge of the canvas was turned up along the wall. A third strip of canvas was then placed against the wall and supported by inclined pieces of drill steel or other means, in such a manner that it covered the lower several feet of the wall, reaching from just below the line of the sample and overlapping the floor canvas. This was found to be necessary, as, without the third strip of canvas, much of the sample might be lost by falling down under the edge of the floor canvas.

Two Men on Drill Advisable

Though it is possible for one man to operate the jackhammer without a support, it is advisable, particularly in hard rock or ore, to use two men and to furnish a support for the drill, as it is not as tiring, and a greater amount of work and a higher degree of accuracy will result. Two supports were used at different times. One was a short piece of ladder and the other a cross-stand. The stand was made of two pieces of 2-in. pipe about 4 ft. long and two pieces of 2-in. pipe about 6 in. long, screwed into a 2-in. cross, forming an X, in which the two longer pieces were the legs of the stand and the two shorter pieces on top formed the saddle or crotch, in which the jackhammer was placed in an approximately horizontal position, and at right angles to the plane of the stand. Elbows should be screwed on to the lower ends of the legs, as otherwise the sharp edges of the pipe will cut through the canvas. Though 2-in. pipe was used, it is thought that lighter and smaller pipe will serve the purpose as well, if not better.

The cross-stand support, with the longer lengths of pipe down, was placed on the canvas parallel to the wall, and the jackhammer was then placed in the upper crotch between the short pieces of pipe, at such a distance from the wall that the drill-bit would rest at the rock or face.

The driller operated and directed the jackhammer with the assistance of the helper, who at times was required to hold the drill bit at the working face when starting a cut. In addition, the helper had at all times to hold a sack saddled over the drill and against the

face, covering the channel sufficiently above and below, so as to prevent the chips and drillings from being lost through flying or scattering off the floor canvas. The sack of cloth was about 12 x 16 in. in size. On one of the longer edges a light stick was nailed, and from the other long edge of the sack a cut or slit was made at right angles for about 8 in. and toward the edge on which the stick was nailed, so that when held horizontally and lowered over the drill, the sack would saddle the drill and permit it to be operated through the slit, the sack covering the face of the rock or ore being sampled. It serves the purpose of a buffer, against which the chips and drillings strike, and then fall to the floor canvas. This was found to be necessary, for, without it, the chips and drillings scattered off the canvas to a considerable extent, and the accuracy of the sample was consequently impaired.

Upon the completion of a cut or channel, the walls (which at the start had been washed clean) were lightly brushed down, so that all drillings or chips which had clung to parts thereof were collected with the remainder of the sample on the floor canvas. To eliminate as much as possible of the error that might be caused by pieces of rock or ore falling off the face or walls, it was decided that all such pieces should be discarded, and that the samples should consist only of the drillings and chips actually cut from the channel. This was considered more advisable than to attempt to make proportional allowances in the channel for pieces of ore or rock that would fall from the face, as the latter course would probably have introduced additional errors. Therefore if any pieces of rock or ore had fallen off the wall, these pieces were picked out of the samples, cleaned off, and thrown away. The sample was then transferred from the canvas to a powder box, and then to a sack, which was labled by tags inside and out, and sealed.

The holes in the ends of the drill bits may be plugged with wood, so as to decrease the amount of dust and possible loss therefrom. The cross bit has the advantage over the Carr bit, at least when starting a cut, but both kinds were used, as some of the crews preferred the Carr bit, whereas others preferred the cross bit. Several check samples were taken toward the end of the work, and the results showed a close comparison with the original samples.

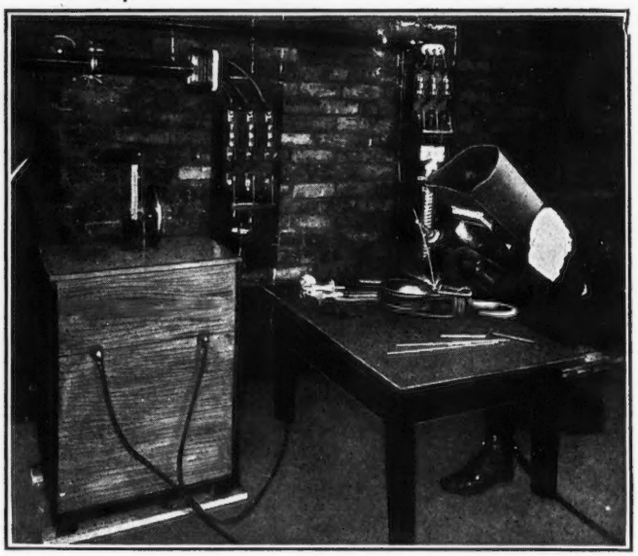
Portable Electric Arc Welder

Electric arc welding of the past has been thought of in the light of large installation of considerable cost. It has further been understood that since the installation consists of a motor generator set entailing moving parts, there might be some difficulty in connection with its operation from time to time. It has always been understood to be inefficient on cast iron and in connection with over-head welding.

The new "Zeus" arc welder manufactured by the Gibb Instrument Co., of Detroit, Mich., consists of a simple transformer with no moving parts. It has been found that the current consumption is from 20 to 40 per cent less than the motor generator type. One feature is its adaptability to overhead welding, which class of welding has given considerable trouble in the past. It has further been found to be adaptable to the welding of cast iron.

This type of welder is comparatively small, and, because of its convenient size, it is portable. It is built on a unit system whereby a 150-ampere machine may be installed, and when the work becomes heavier a duplicate may be connected in parallel with the original machine.

One of the features of the welder is its arrangement for regulation. It is not necessary to change the connections in any way in the regulation of the



PORTABLE ELECTRIC ARC WELDER IN USE

arc. A wheel connected with the secondary and extending through the top of the case, raises and lowers the secondary and provides for the regulation of the current necessary for different sizes of electrodes. The inherent reactance automatically stabilizes the arc for different arc lengths.

Nechi Mines, Ltd., (Colombia)

The annual report of the Nechi Mines, Ltd, Colombia, for the year ended Sept. 30, 1918, states that 1,076,558 cu.yd. were dredged from Nechi ground during the first six months of the year, the gross value of gold recovered being $253,787, averaging 23.57c. per cu.yd., with an average depth of 45.3 ft. The field costs averaged 4.9c. per cu.yd. During the previous twelve months, 1,883,659 cu.yd. was dredged, the gross value of the gold recovered being $489,959, averaging 26.01c., with an average depth dredged of 55 ft. The field costs averaged 5.55c. per cu.yd. The sum of £1,000 per month for rental was paid to the Pato Co. for the use of its plant.

During the second half of the year, 1,066,371 cu.yd. was excavated by the Nechi dredge from Pato grounds, the field costs averaging 6.7c. per cu.yd. The dredge operated 76.1 per cent of its full time, as compared with 61.8 per cent for the previous year. The original estimated gross value in the Nechi prospected area was $4,926,600. There has been extracted by dredging operations since the formation of the company $1,287,085. The year's extraction for 1917-18 was $253,787, making the extracted value since the beginning of operations $1,540,872, and leaving available for dredging on the tested areas $3,385,728.

The net receipts, including gold returns, £50,229, platinum, £225, and the company's share of the profit from the working of the Nechi dredge on the Pato ground, £8,320, amounted to £64,199. Field costs were £18,552.

The War Minerals Relief Scandal

UNDER the above caption, in the *Mining and Scientific Press* of Aug. 16, 1919, beginning on page 219, appeared the following editorial:

We return to this subject because it is vital to a large number of miners in the West and concerns a matter of public policy that ought to interest every citizen. We regret to observe several signs of an effort on the part of Government officials to over-zealousness, verging on cheap smartness, in the interpretation and administration of the Act passed by Congress for the purpose of compensating those who, in response to a patriotic call, engaged in the production of chrome, manganese, pyrite, and tungsten, and who, in their attempt to fulfil a national duty, suffered financial loss, chiefly through the bungling of the Ferro-Alloys Section of the War Industries Board last year. In our issue of July 19 we criticized the way in which the Secretary of the Interior, in whose hands the administering of the Relief Act was placed, 'passed the buck' to the Attorney-General, and the latter's technical interpretation of the Act in such a way as to exclude from relief a large number of miners who were importuned to produce the needed minerals by the press propaganda of Secretary Lane himself. We note that the Relief Commission, now in session at Medford, Oregon, has received a letter from Mr. Henry M. Parks, the Director of the Oregon Bureau of Mines, in which he testifies to having ordered the field staff of his bureau "to do everything possible to encourage new development, and speed up the production of manganese and chrome." According to the Attorney-General's ruling, the fact of engaging in the mining of these minerals at the instance of the Oregon Bureau of Mines will not suffice to justify the award of compensation, because the claimant cannot prove that he had been "asked specifically by one of the five Government agencies named in the Bill." Yet Mr. Parks testifies that in October, 1917, he received a letter from Mr. George Otis Smith, Director of the U. S. Geological Survey, requesting him "to exert every effort to increase the domestic production of chrome ore" and "to this end," Mr. Smith added, "the hearty co-operation of your organization is earnestly invoked." Is the Government to go back on Mr. Parks and the members of his staff, stultifying and dishonoring them in the eyes of the men who trusted in them and believed them to be authorized in their efforts to stimulate the production of chrome and manganese in Oregon? Legal gentlemen say that "good conscience" should determine the validity of claims; we ask what kind of conscience has an official who distinguishes between a request made by "one of the five Government agencies named in the Bill" and a request made known by persons to whom the said agencies appealed for help in advertising their urgent demands, whether it be the director of a State bureau in Oregon or the editor of a respectable paper in San Francisco. In our issue of August 2, we criticized the nature of the cross-examination to which claimants are being subjected by the Relief Commission. There is this further point to be made, that the claimants for larger amounts are able to present briefs prepared by a competent lawyer and they go before the Commission accompanied by a lawyer, so that the amiable attempt to subject them to a crude and misleading psychological test does not succeed, although it does succeed in raising an entirely false issue when applied to the less sophisticated claimants.

Now we come to another unpleasant phase of this affair. We are infomed that Mr. J. E. Spurr, Chief Engineer for investigative work under the Act, insists upon having all reports sent to him direct at Washington. When the Relief Bill was passed, a corps of examiners was organized for the purpose of scrutinizing the correctness of the claims presented to the Commission. The reports of these examiners are essential to the adjudication by the Commission, yet the Chief Engineer has refused to allow this necessary information to be given promptly to the Commission, insisting upon the reports being sent to Washington, to be abstracted by him, thereby further delaying the awards, which in any event are going to be unconscionably belated. What is worse, he has seen fit to dismiss an engineer for telling the truth. We regret to make this strong criticism, because the Chief Engineer has just arranged to become the editor of our competitor at New York, but this is a matter too important to be set aside on personal grounds; it concerns the profession deeply, as will be shown. Among the engineers retained by Mr. Albert Burch, acting for the U. S. Bureau of Mines in its campaign to promote the production of war minerals, was Mr. R. H. Toll, whom we have known for 20 years as an intelligent, trustworthy, and honorable mining engineer. In the performance of his duty he told Mr. L. R. Payne, of Fresno, of the need for intensifying the production of chromite and of the Government's intention to protect the producer by market control. At Mr. Payne's request, he confirmed his verbal statement by a written one to the same effect. This letter was submitted by Mr. Payne as part of his evidence when he presented his claim for compensation to the Commission. Meanwhile Mr. Toll had been again engaged by the Government, this time as an examiner under the Relief Act, and he was doing his work when he received the following telegram from the Chief Engineer: "With reference to claim 480 L. R. Payne & Co., Fresno, California, on March 12, 1919, you wrote the manager a letter in which you state 'In addition to patriotic motives in doing this you had the assurance of the Government through me that you would be protected at least a year on the prevailing market price.' You must be aware that no branch of the Government ever gave such assurance or had the authority for so doing and that you have no authority to make this statement; under the circumstances it would evidently be better if your present temporary appointment, which expires July 31, should not be renewed; will you turn over the claims and data which you have on hand to Mr. Hyder, who will leave for San Francisco within a few days." Whereupon Mr. Toll replied by quoting from two statements made by the Chief Engineer himself and now to be found in the records of the Relief Commission. The first was a telegram of August 8, 1918, to Mr. Burch, as follows: "War Board in Washington are all agreed that California chrome production shall be maintained and are ready to take whatever steps are necessary. Just what these steps [are to be] will be determined promptly." The second was a letter of September 30, 1918, to Mr. Charles H. Holbrook, as follows: "Reply to your letter of September 12th has been delayed pending a survey of the chromite situation by various Government departments. The War Industries Board telegraphed to Mr. Burch of San Francisco as follows: 'It may be announced that it is the present intention of the War Industries Board to arrange for continued production in the United States for the first half of 1919 at the rate proportionate to the rate of 1918 production, and the trade will be asked to purchase chromite produced in the United States during the first half of next year at this rate.' No doubt machinery for carrying this program into effect will be devised by the War Industries Board." On September 27, 1918, Mr. H. W. Sanford, chief of the Ferro-Alloys Section of the War Industries Board, telegraphed a little more explicitly: "It is the present intention of the War Industries Board to arrange for continued chromite production in the United States for the first half of 1919 at a rate proportionate to the rate of 1918 production, and the trade will be asked to purchase chromite of suitable grade produced in the United States during the first half of next year at this rate. No announcement can be made regarding prices. Believe tonnage of domestic chromite produced during the balance of this year can be sold at the average prices paid this summer by the California Chrome Company. If unable to find ready market for ore, wire this office, giving tonnages ready for immediate delivery and guaranteed analysis and prices wanted and to whom already offered and refused. Chemical refractories and steel trades likely buyers." This

telegram was addressed to the President of the San Francisco Chamber of Commerce. The references to 'market' and 'rate' made in the statements of Government agents have no meaning, of course, unless they signify a price at which the products mentioned could be sold remuneratively. It seems to us that Mr. Toll was justified in the statement he made to Mr. Payne in June, 1918, and confirmed by letter subsequently. Mr. J. S. Diller and other representatives of the Geological Survey told the Californian miner to start the mining of chrome before the War Minerals Bill was passed; the miner in the hills was told that it was "as good as passed"; in the Bill it was stated: "The Secretary of the Interior, with the approval of the President, is authorized from time to time to enter into contracts for necessaries for periods not exceeding two years," which was an implicit guarantee of a profitable market for at least two years. One of the oldest games in the world is for a superior to tell a subordinate to do something and then fail in moral courage to back him up later. Mr. Toll's statement to Mr. Payne was based on what he had been told by those in charge of the chrome propaganda; it was made in good faith both to the Government and to the chrome miner. Is a professional man expected to say one thing to the buyer and another to the seller? Is he a mere hireling?

These people at Washington do Uncle Sam small honor if they suppose that so frank, big-hearted, and honorable a gentleman could desire his servitors and assistants to employ such pawky tactics. It appears that the new editor of the 'Engineering and Mining Journal' is to follow in the tradition of his predecessor, who opposed both the War Minerals Bill and the Relief Bill, which was its logical sequence, and, not content with such opposition, has seen fit to sneer at the miner of the West as a 'profiteer' and 'patrioteer'. One word more, to summarize the whole affair: what would be the attitude of the mine, not to the Government, but to the representatives of the Bureau of Mines, Geological Survey, and Department of the Interior, if the United States became involved in another war, calling again for an intensive production of sundry minerals? What would the miner say to these gentlemen? His language, like that of Bret Harte's hero, would be, we venture to guess, "painful and free."

Under date of Aug. 20, 1919, reply to the above editorial was made as follows:

Editor, *Mining and Scientific Press*,
San Francisco, California.
Dear Sir:

I note your editorial on the War Minerals Relief "Scandal" in your issue of August 16, and it apparently calls for a reply. I will not attempt to follow the sinuosities of your article, but will go straight to the point and give certain information which you could have had before if you had wanted it.

1. It may interest you to know that on May 9, 1919, I submitted to the proper authorities a plan to interpret the provision which Congress had inserted in the War Minerals Relief Act (limiting the possibility of compensation to those who had produced certain minerals "in compliance with the request or demand" of certain Departments and War Boards), by assuming that the *general Government campaign of stimulation* could be interpreted as such a request or demand. There follow extracts from my presentation, which was a long one and contains much that is not germane to the point I wish to make:

"The proper application of the Act and the correct interpretation of the phrase above quoted can only be made through a close knowledge of the history of the situation which led miners to feel that the Government had enlisted assistance in a program of which the Government itself failed to carry out its part, and led Congress to see the justice of their complaint and to provide for compensation at the Secretary's discretion.

"The activity of the Government which gave rise to the situation on which the claims of the miners for compensation were based, was that of the Shipping Board and the War Trade Board, which, in accordance with the Executive Order of the President to secure ships for military purposes by cutting down imports, formulated and put into effect a program for the restriction of imports of pyrites, chromite, and manganese, and called on the country in unmistakable and vigorous terms to produce enough to make good the deficiency as an act of patriotism.

"The general active stimulation and vigorous encouragement which amounted practically to a general 'request or demand' by the Government concerning these minerals warrants, in my opinion, a general plan of compensation for the losses entailed in mining these minerals as a consequence of this governmental campaign of stimulation; and is a far stronger justification for compensation by the Government than the representations or informal advice, opinion, or encouragement of any minor official or officials of the Government."

2. You must know, however, that in the United States the only body or individual authorized to dip its hand into the public Treasury is Congress. The question was, therefore, not what I or you, the Commission or the Secretary, would like to pay out of the Treasury, but what Congress had authorized to be paid out; our personal opinions do not warrant our tapping the public funds, whether for our own enrichment or that of our friends, or of attempting to do so; and, fortunately for the public, there would be little guarantee of personal safety to anyone thus attempting to carry out his convictions. The matter was finally referred to the Attorney General, as the official interpreter of legislative language, and he rendered on July 1, 1919, a decision, in which he clearly showed from the language of the act and its history, the intent and authority of Congress. He stated, "The language used could hardly be more clear or allow less room for construction. No claim based upon a general solicitation or appeal is recognized by it, but to come under the statute the claimant must have been asked specifically by either the Department of the Interior, the War Industries Board, the War Trade Board, the Shipping Board, or the Emergency Fleet Corporation to produce or prepare to produce one or more of the four named minerals."

Even the Attorney General, you must know, has no authority to modify legislation. Your editorial would indicate that you thought he had.

3. The work done by Mr. Burch and his assistants in stimulating the production of chromite and other war minerals on the Pacific Coast was of the most effective and valuable character, and their patriotic services have always been fully appreciated by their colleagues in Washington. The stimulation was of the most vigorous kind which circumstances and their authority permitted; not only individuals were exhorted, but addresses were made by the engineers at public gatherings in mining districts. (Entirely similar activity, it may be noted, was carried on by Government engineers and geologists in the East.) It was on account of this most valuable work and their familiarity with the field that on the organization of the War Minerals Relief field examinations as many of the old

staff as could be secured were re-engaged. Only Messrs. Shonts (in Oregon) and Cameron and Toll (in California) could be secured.

4. All decisions relative to War Minerals Relief are in the hands of the Commission. On request, I undertook (dare I say for patriotic reasons?) to prolong my war time connection with the Government long enough to organize the investigative force, but no longer. The function of this force is to provide the Commission with such facts as they may request, whereon to base their decisions. Therefore, I do not know what their attitude may be on any question, but personally (not officially) I have always felt that the case of the Pacific Coast chrome miners was one of the strongest which they will have to consider on this very point of "request or demand," and precisely on account of the requests presented by our field engineers. And in the case of each claim which comes up for examination (this applies to the whole United States) the field engineer or other Government official who is named by the claimant as having made upon him a request or demand for production, is immediately interrogated by special letter as to the facts, and such testimony is very influential in determining the order of examinations. In the case of large numbers of claims, we have the written testimony of engineers, nearly all of them now on our staff or on that of the Geological Survey, that they made such request or demand, and, in my personal opinion, these represent a very strong class of claims for the Commission to consider.

5. The claim of L. R. Payne & Co., No. 480, was judged on the basis of Mr. Toll's testimony to belong in the above class, and a field examination was ordered July 18, 1919, by Harry Sheafe, engineer (employed on recommendation of Mr. Burch) and E. L. Fleming, auditor.

6. What, then, was the basis for discontinuing Mr. Toll's services as field examiner, of which he and you make a national issue?

You state that he was dismissed "for telling the truth." Judged on the basis of this statement alone, you would have been in little danger of dismissal had you been in Mr. Toll's place.

In the interval between his engagements as Government engineer he made reports and affidavits for various claimants, whose mines he had examined while in the Government's employ in order to assist them in collecting from the Government. But I find no valid reason for criticising him for this. The reasons why his attitude might be considered by some as having become slightly unjudicial were:

a. He made these reports, letters, and affidavits for the claimant for a monetary consideration, as I was advised by the Commission when in San Francisco.

b. In his letter written for the Payne Co. to exhibit he overstated the facts. He stated that he gave claimant certain sweeping Government guarantees on June 7, 1918. When his authority for this was challenged he cited first a letter written by me to another party on September 30, 1918, second a clipping from the San Francisco *Examiner* of October 1, 1918, and third a telegram from myself to Mr. Burch dated August 8 or 9, 1918. In my reply to Mr. Toll I summed up as follows:

"All of this would seem to indicate to me that you derived your impression from the above letter and telegram, but at a subsequent time from that which you assign in your letter of July 23 to me and refer to in your letter of March 12, 1919, to the L. R. Payne Co., and that accordingly your letter to the L. R. Payne Co. was an error of recollection. This would indicate a zeal in supporting the claimant which is hardly judicial."

It was felt that, to be above criticism, any question as to the judicial attitude of any examiner should be settled by relieving him of further responsibilities. Examiners must be prejudiced neither for nor against claimants. All appointments are temporary, as is (let us hope) the character of our work. No onus was involved, and it is too bad that Mr. Toll decided to rush into publicity and that you were hasty enough to take it up. Several other examiners have had their terms of employment terminated, but so far have not appealed to the President to be put on the payroll again.

Having given you a deal of information, I should like to have some myself:

1. What is your motive in rushing into a personal attack, without trying or apparently wanting to ascertain the facts? Many months ago, touched by your editorial efforts to comment intelligently on what was going on in Washington, I wrote you, offering to write or telegraph information whenever you wished it. You have never called for any.

2. This is a psychological problem. Why is it that an editor who hates the daily yellow press as laudably as you do should himself tend so strongly in the direction of technical yellow journalism?

I shall be glad if you will publish this letter in full.

Yours very truly,

J. E. SPURR.

Federal Taxation of Mines

The mines of the country are called upon to bear a large part of the enormous taxes which must be raised. The Internal Revenue Bureau, which is charged with the assessment and collection of these taxes, desires that the taxation laws shall be administered in a fair and businesslike way. The application to mines, however, which have wasting assets, involves questions of particular complication and difficulty. To meet this situation, there has been established in the income-tax branch a section of mine valuation, in which these specific problems of the industry will be handled by competent engineers. It is realized, however, that something more than this is required for the satisfactory application of the tax laws to the mines, namely, as complete understanding as possible between the Government and the taxpayer, a spirit of co-operation as between the two, and every possible assistance and advice from mine owners and mining engineers.

At the Chicago meeting of the A.I.M.E., Dr. L. C. Graton, a member of the valuation section of the Internal Revenue Bureau, will outline the general problems involved in the mine-taxation program, and will present the methods for accomplishment of that program which are now under consideration and which it is hoped may be improved and made authoritative by the suggestions which may come from the members of the Institute. In this way it is hoped that fundamental principles may be established and individual settlements reached that will be so reasonable and fair that they will be final. The Government entertains the earnest desire, and a similar wish is shared by the institute, that the fullest discussion may be given to this subject at the Chicago meeting.

Chicago Meeting, A. I. M. E.

Papers To Be Presented Include Great Variety of Subjects—Special Arrangements Made for The Entertainment of Wives and Daughters of Members—Informal Talks At Smoker—Programs of the Sessions

THE program of the technical sessions to be held at the 120th meeting of the American Institute of Mining and Metallurgical Engineers, Chicago, Ill., Sept. 22 to 26, includes a large number of papers covering a wide variety of subjects. These, arranged by sessions, are as follows:

SESSION ON NON-FERROUS METALLOGRAPHY†

MONDAY, SEPT. 22, 11 A.M.

"Manufacture and Electrical Properties of Manganin." By F. E. Bash.

"Grain Growth in Alpha Brass." By F. G. Smith. Illustrated by lantern slides.

"Five Foundry Tests of Zinc Bronzes." By C. P. Karr.

"Manufacture and Electrical Properties of Constantan." By F. E. Bash.

"Tin Fusible Boiler Plug Manufacture and Testing." By L. J. Gurevich and J. S. Hromatko.

"Heat Treatment of Aluminum Alloy Castings." By Zay Jeffries and W. A. Gibson.

"Influence of Heat Treatment on Gun Metal." By C. F. Smart.

"Deterioration of Nickel Spark-Plug Terminals in Service." By Henry S. Rawdon and A. I. Krynitzky.

"Heat Treatment of Duralumin." By Paul D. Merica, R. G. Waltenberg, and H. Scott.

"Mechanical Properties and Resistance to Corrosion of Rolled Light Alloys of Aluminum and Magnesium With Copper, Nickel and Manganese." By Paul D. Merica, R. G. Waltenberg, and A. N. Finn.

"Simplification of Inverse-Rate Method for Thermal Analysis." By Paul D. Merica.

"Constitution and Metallography of Aluminum and Its Light Alloys With Copper and With Magnesium." By Paul D. Merica, R. G. Waltenberg, and J. R. Freeman, Jr.

"Some Properties and Application of Rolled Zinc Strip and Drawn Zinc Rod." By C. H. Mathewson, C. S. Trewin, and W. H. Finkeldey.

"Physical Properties of Certain Lead-Zinc Bronzes." By Homer F. Staley and C. P. Karr.

"Physical Properties of Nickel." By David H. Browne and John F. Thompson.

SESSION ON MINE TAXATION

MONDAY, SEPT. 22, 11 A.M.

"Mine Taxation." By Dr. L. C. Graton.

SESSION ON COAL AND GAS

MONDAY, SEPT. 22, 11 A.M.

"*Research in the Coal-Mining Industry." By E. A. Holbrook.

"*Some Factors That Affect the Washability of a Coal." By Thomas Fraser and H. F. Yancey.

"A Use Classification of Coal." By George H. Ashley.

"Distribution of Anthracite." By A. S. Learoyd.

SESSION ON COAL AND GAS

MONDAY, SEPT. 22, 2 P.M.

"*Height of the Gas Cap in the Safety Lamp." By C. M. Young.

"*Engineering Features of Modern Large Coal Mines in Illinois and Indiana." By C. A. Herbert and C. M. Young.

"*Gas-Producer Practice." By G. S. Brooks and C. C. Nitchie.

"*Testing of Coals for Byproduct Coking and Gas Manufacture." By Horace C. Porter.

"*Coals of Ohio and Their Limitations for Byproduct Coke." By Wilber Stout.

"*Outdoor Substations in Connection With Coal-Mining Installations." By H. W. Young.

SESSION ON GEOLOGY

MONDAY, SEPT. 22, 2 P.M.

"*Chrome-Ore Deposits in Cuba." By Ernest F. Burchard.

"*Recent Studies of Domestic Chromite Deposits." By J. S. Diller.

"*Manganese-Ore Deposits in Cuba." By Ernest F. Burchard.

"*Correlation of the Formations of the Huronian Group in Michigan." By R. C. Allen.

"Mud Volcanoes in Colombia." By Stanley C. Herold.

"Magnesite; Its Geology, Products and Their Uses." By C. D. Dolman.

"Titaniferous Iron Sands of New Zealand." By V. W. Aubel.

"Recent Studies of Domestic Manganese Deposits." By E. C. Harder and D. F. Hewett.

SESSION ON MILLING

MONDAY, SEPT. 22, 2 P.M.

"*Chilean-Mill Practice at the Portland Mill." By Luther W. Lennox.

"Graphic Metallurgical Control." By H. M. Merry.

"Mill Operations at the United Eastern During 1917-1918." By Wheeler O. North.

"Crushing Practice at New Cornelia Copper Co." By W. L. Du Moulin.

SESSION ON INDUSTRIAL ORGANIZATION

MONDAY, SEPT. 22, 2 P.M.

"Method of Curtailing Forces at the Copper Queen." By Charles F. Willis.

"Educational Methods at the Copper Queen." By Charles F. Willis.

"Physical Examination Previous to Employment." By Charles F. Willis.

SESSION ON IRON AND STEEL

TUESDAY, SEPT. 23, 2 P.M.

"*Blast-Furnace Refractories." By Raymond M. Howe.

"Effervescing Steel." By Henry D. Hibbard.

"Aircraft Steels." By Albert Sauveur.

"*Determining Gases in Steel and the Deoxidation of Steel." By J. R. Cain.

"*Effect of Time and Low Temperature on Physical Properties of Medium-Carbon Steel." By G. A. Reinhardt and H. L. Cutler.

"Erosion Tests of Rifle Barrels." By A. E. Bellis.

"Metallography of Rifle-Barrel Steel." By G. F. Butterworth.

SESSION ON IRON AND STEEL

TUESDAY, SEPT. 23, 8 P.M.

"*Industries of the Chicago District." By T. W. Robinson. Illustrated with lantern slides.

"*Manufacture of Steel Rails." By Robert W. Hunt.

"*The World's Largest Plate Mill." By C. L. Huston.

†These papers, which will be presented at the Philadelphia meeting of the Institute of Metals Division, Sept. 29-Oct. 2, will be read here by title only to afford opportunity for discussion.

Papers marked * will be presented by the authors; ** by the authors' representatives; all others by title only.

SESSION ON OIL

TUESDAY, SEPT. 23, 8 P.M.

"*Irvine Oil District, Kentucky." By Stuart St. Clair.
"Petroliferous Provinces." By E. G. Woodruff.
"Investigations Concerning Oil-Water Emulsion." By A. W. McCoy, H. R. Shidel, and E. A. Trager.
"Essential Factors in Valuation of Oil Properties." By Carl H. Beal.
"Application of Law of Equal Expectations to Oil Production in California." By Carl H. Beal and E. D. Nolan.
"Value of American Oil Shales." By Charles Baskerville.

SESSION ON IRON AND STEEL

WEDNESDAY, SEPT. 24, 10 A.M.

"*Cooling Properties of Technical Quenching Liquids." By N. B. Pilling and T. D. Lynch.
"*Differential Crystallization in Cast-Steel Runner." By Francis B. Foley.
"*Manufacture and Properties of Light-Wall Structural Tubing." By H. J. French.
"*Oxygen in Cast Iron and Its Application." By Wilford L. Stork.
"Graphitization of White Cast Iron Upon Annealing." By Paul D. Merica and L. J. Gurevich.
"Experimental Data Obtained on Charpy Impact Machine." By F. C. Langenberg.
"*Heat Treatment of Cast Steel." By John H. Hall, Arvid E. Nissen, and Knox Taylor.
"Deep Etching of Rails and Forgings.'" By F. M. Waring and K. E. Hofammann.

SESSION ON SULPHUR IN COAL

WEDNESDAY, SEPT. 24, 10 A.M.

"*Geographic Distribution of Sulphur in the West Virginia Coal Beds." By I. C. White.
"*Occurrence and Origin of Finely Disseminated Sulphur Compounds in Coal." By Rheinhardt Thiessen. Illustrated by lantern slides.
"*Mechanical Separation of Sulphur Minerals From Coal." By J. R. Campbell.
"Sulphur in Coal—Geological Aspects." By George H. Ashley.
"Forms in Which Sulphur Occurs in Coal." By A. R. Powell.
"Effect of Sulphur in Coal Used in Ceramic Industries." By C. W. Parmelee.

SESSION ON SULPHUR IN COAL

WEDNESDAY, SEPT. 24, 2 P.M.

"*Removal of Sulphur From Illuminating Gas." By W. W. Odell and W. A. Dunkley.
"*Low Sulphur in Coal." By H. M. and T. M. Chance.
"Low-Sulphur Coals of Kentucky." By Willard R. Jillson.
"Low-Sulphur Coal in Illinois." By Gilbert H. Cady.
"Sulphur in the Coking Process." By S. W. Parr.
"Commercial Recovery of Pyrite From Coal." By S. H. Davis.
"Sulphur in Producer Gas." By F. Crabtree and A. R. Powell.

SESSION ON MINING AND LOCAL RESOURCES

WEDNESDAY, SEPT. 24, 10 A.M.

"*Wisconsin Zinc District." By W. F. Boericke and T. H. Garnett.
"*Mineral Resources of the La Salle District." By J. A. Ede.
"*New Angles to the Apex Law." By John A. Shelton.
"Mining Methods of Alaska Gastineau Mining Co." By G. T. Jackson.
"Tunnel Driving at Copper Mountain, B. C." (Columbia Section Paper). By Oscar Lachmund.
"Geology and Mining Methods at Pilares Mine." By W. Rogers Wade and Alfred Wandtke.
"Wedging Diamond-Drill Holes." By O. Hall and V. P. Row.

SESSION ON NON-FERROUS METALLURGY

WEDNESDAY, SEPT. 24, 2 P.M.

"*Electric-Resistance Furnace of Large Capacity for Zinc Ores." By Charles H. Fulton. Illustrated by lantern slides.
"Water and Chlorides in Cement Copper Briquettes." By Edward Keller.
"Chemical and Electrochemical Problems Involved in New Cornelia Copper Company's Leaching Process." By Henry S. MacKay.
"Electrolytic Zinc." By C. A. Hansen.
"*Treating Antimony Ores." By George P. Hulst.

SESSION ON PYROMETRY[2] WITH SPECIAL REFERENCE TO IRON AND STEEL METALLURGY

WEDNESDAY, SEPT. 24, 2 P.M.

"*Report of Committee on Pyrometry of National Research Council." By George K. Burgess.
"*Pyrometry in Blast-Furnace Work." By P. H. Royster and T. L. Joseph.
"*Pyrometry and Steel Manufacture." By A. H. Miller.
"*Electric Open-Hearth and Bessemer Steel Temperatures." By F. E. Bash.
"*Some Thermal Relations in the Treatment of Steel." By Charles F. Brush. Illustrated by lantern slides.
"*Pyrometry in the Tool Manufacturing Industry." By J. V. Emmons.
"*Rate of Heating and Cooling of Large Ingots for Forging." By F. E. Bash.

SYMPOSIUM ON PYROMETRY[2]

THURSDAY, SEPT. 25, 10 A.M.

"Temperature." By J. S. Ames.
"*Standard Scale of Temperature." By C. W. Waidner, E. F. Mueller, and Paul D. Foote.
"*Metals for Pyrometer Standardization." By C. W. Waidner and George K. Burgess.
"*Fundamentals of Pyrometry." By C. E. Mendenhall.
"*Thermoelectric Pyrometry." By Paul D. Foote, T. R. Harrison, and C. O. Fairchild.
"Potentiometers for Thermoelement Work." By Walter P. White.
"Self-Checking Galvanometer Pyrometer." By H. F. Porter.
"*Some Factors Affecting the Use of Base-Metal Thermocouples." By O. L. Kowalke.
"*Tables and Curves for Use in Measuring Temperatures With Thermocouples." By L. H. Adams. Illustrated by lantern slides.
"Reference Standard for Base-Metal Thermocouples." By N. E. Bonn.
"Alloys Suitable for Thermocouples and Base-Metal Thermoelectric Practice." By J. M. Lohr.
"*Recent Improvements in Pyrometry." By R. P. Brown.
"Automatic Correction for Temperature of Cold Junctions." By F. Wunsch.
"*Hot Wire Anemometer With Thermocouple." By T. S. Taylor. Illustrated by lantern slides.
"*Porcelain for Pyrometric Purposes." By F. H. Riddle.
"Pyrometer Porcelains and Refractories." By R. W. Newcomb.
"*Porcelain Pyrometer Protecting Tubes." By F. A. Harvey. Illustrated by lantern slides.
"Porcelain Tubes for Thermocouples." By R. B. Lincoln.
"Melting Point for Refractory Materials." By Leo I. Dana.
"*High-Temperature Scale and Its Application in the Measurement of True, Brightness, and Color Temperature." By Edward P. Hyde.
"*Theory and Accuracy in Optical Pyrometry With Particular Reference to the Disappearing-Filament Type." By W. E. Forsythe. Illustrated by lantern slides.

[1]Presented at the June, 1919, meeting of the American Society for Testing Materials, and read here by title to afford opportunity for discussion.

[2]In co-operation with the National Research Council and the U. S. Bureau of Standards.

"*Optical and Radiation Pyrometry." By Paul D. Foote and C. O. Fairchild.

"*Industrial Application of the Disappearing-Filament Type of Optical Pyrometers." By F. E. Bash.

"Use of the Optical Pyrometer for Control of Optical-Glass Furnaces." By C. N. Fenner.

"*Emissive Powers and Temperatures of Non-Black Bodies." By A. G. Worthing. Illustrated by lantern slides.

"Recording Thermocouple Pyrometers." By Leo Behr.

"*Recording Pyrometry." By C. O. Fairchild and Paul D. Foote.

"*High Temperature Control." By C. O. Fairchild and Paul D. Foote.

"**Resistance Thermometry." By F. W. Robinson.

"*Tin; an Ideal Pyrometric Material." By E. F. Northrup.

"Resistance Thermometry for Industrial Use." By Charles P. Frey.

"Thermocouple Installation in Annealing Kilns for Optical Glass." By E. D. Williamson and H. S. Roberts.

"Annealing of Glass." By A. Q. Tool and J. Valasek.

"*Pyrometry Applied to Bottle-Glass Manufacture." By R. L. Frink.

"*Pyrometry in the Manufacture of Optical Glass." By Albert J. Walcott.

"Pyrometry as Applied to the Manufacture of Optical Glass." By Carl W. Keuffel.

"*Pyrometry Shortcomings in Glass-house Practice." By W. M. Clark and Charles D. Spencer.

"*Pyrometry in Manufacture of Clay Wares." By F. K. Pence.

"*Application of Pyrometry to the Manufacture of Gas-Mask Carbon. By K. Marsh. Illustrated by lantern slides.

"*Pyrometry in the Ceramic Industries." By C. B. Thwing.

"Pyrometry in Rotary Portland Cement Kilns." By Leo I. Dana and C. O. Fairchild.

"Pyrometry in the Ceramic Industry." By John P. Goheen.

"*Temperatures of Incandescent Lamp Filaments." By Benjamin E. Shackleford. Illustrated by lantern slides.

"Temperature Measurements of Incandescent Gas Mantles." By H. E. Ives.

"*Applications of Pyrometry to Problems of Lamp Design and Performance." By I. H. Van Horn. Illustrated by lantern slides.

"Use of Modified Rosenhain Furnace for Thermal Analysis." By H. Scott and J. R. Freeman, Jr.

"High-Temperature Thermometers." By R. M. Wilhelm.

"**Temperature of a Burning Cigar." By T. S. Sligh and H. R. Kraybill.

"Teaching Pyrometry in Our Technical Schools." By George V. Wendell.

"*Teaching Pyrometry." By C. E. Mendenhall.

"Teaching Pyrometry." By O. L. Kowalke.

"*Present Status of Radiation Constants." By W. W. Coblentz.

"Pyrometer Protection Tubes." By Otis Hutchins.

The program of entertainment which has been arranged for the benefit of the wives and daughters of Institute members includes the following:

Monday: Theater party at the Riviera.

Tuesday: Trip to Gary, Ind.

Wednesday: Trip to Great Lakes Naval Station, leaving Congress St. station at 11 o'clock and returning from station at 3.45 p.m.

Wednesday evening: Banquet.

Thursday: Trip to La Salle, Ill.

Friday: Luncheon at the South Shore Country Club.

Sears, Roebuck & Co. have extended an invitation to visit their plant, and guests are to be given a luncheon while there.

At the smoker to be held on Monday evening, Sept. 22, at 8.30, at the Chicago University Club, George S. Rice, F. G. Cottrell, and Frank H. Probert will speak on their investigations and experiences in the war area. Mr. Rice will talk on coal and other features in the north of France, in the Cologne district, southern France, Westphalia, Belgium, and Great Britain, and will take up the subject of liquid oxygen as he observed it in Germany. Dr. Cottrell will talk of his own metallurgical observations in Germany and Austria as well as France, and Mr. Probert will speak on destroyed iron mines and steel plants in France.

The Sulphur Trade of Norway

The greater part of sulphur imported into Norway is used in connection with the sulphite paper-pulp industry, according to a recent consular report. The following table shows the imports and exports of sulphur by Norway from 1910 to 1918, inclusive, in metric tons:

NORWEGIAN SULPHUR IMPORTS AND EXPORTS, 1910-1918

Years	Imports	Exports	Years	Imports	Exports
1910	10,279	618	1915	6,804	41
1911	8,782	166	1916	7,262	...
1912	13,911	1,003	1917	4,071	...
1913	15,411	117	1918	3,036	...
1914	10,347	334	1919 (January and February)	116	...

From this table it is seen that the use of sulphur before the war was almost twice as large as the use since 1914. This was probably due in part to the substitution of pyrites for sulphur at the pulp mills, and also to the use of substitutes in other lines, because of the advancing prices. Also, there is a probability that the stocks of sulphur in the country have been almost completely wiped out since 1914, and thus the actual use since that date has been somewhat greater than the figures indicate.

In connection with the use of pyrites, the report states that, though pyrites constitute one of the leading exports from Norway, they are also extensively used in the paper-pulp industry. The introduction of the pyrite process has been progressing rapidly since 1904, and now it is reported that the greater number of the mills are so equipped, and hence normally use pyrites instead of sulphur. In this connection the following figures showing the production of pyrites are interesting: 1911, 369,055 metric tons; 1912, 464,326; 1913, 441,291; 1914, 414,886; 1915, 513,335 metric tons. The statistics subsequent to 1915 are not available, but the annual production has been at least as great as in that year, as the demand has been large, and at relatively high prices.

During the war, exports of pyrites did not keep pace with the increased production, this signifying that the domestic use of pyrites increased soon after 1914. Exports of pyrites during the last five years were: 1914, 360,228 metric tons; 1915, 466,759; 1916, 253,362; 1917, 212,909; 1918, 240,774 metric tons.

Prior to the outbreak of the war the principal sources of supply of sulphur were Great Britain, Italy, and Spain, whereas in 1915 and 1916 Great Britain and Italy furnished almost the entire supply. Detailed statistics are not available since 1916, but it is known that in 1918 the United States furnished more than 50 per cent of the imports.

The present condition of the sulphur market in Norway is uncertain. The sulphite mills are facing difficulties with respect to marketing their products, and there are rumors that extensive shutdowns are probable, which, of course, will affect the market. Until these conditions become settled, conservatism in buying large quantities of supplies may be expected.

The Chemical Exposition at Chicago

Fifth National Congress of Chemical Industries Will Surpass Former Accomplishments in The Display of Attractive Exhibits—Program of the Sessions and of Papers and Entertainment Features

THE forthcoming Fifth National Exposition of Chemical Industries at the Coliseum and First Regiment Armory, Chicago, during the week of Sept. 22, promises, with the attendant society meetings, to be an assemblage worthy of the past accomplishments of this exposition. The managers report that there are as many exhibitors as at the last exposition, and that there are several who have never before been exhibitors and for whose displays visitors may look forward with interest. The old-established exhibitors have nearly all newly developed products, in which the chemical profession and industries will be interested.

The following program is of course subject to addition and revision, but from it the comprehensiveness of the meetings and discussions may be discerned.

The exposition hours are from 12 noon to 10:30 p.m.

MONDAY, SEPT. 22, 1919

12 m.—Opening of exposition.

2 p.m.—Meeting American Institute of Mining and Metallurgical Engineers at Congress Hotel.

8 p.m.—Opening addresses at Chemical Exposition Auditorium. Governor Frank O. Lowden of Illinois will make the address of welcome. Charles H. Herty, chairman of advisory committee, will respond. John W. O'Leary, president Metal Trades Association of Chicago, "The Relation of the Chemist to the Manufacturer."

9 p.m.—Motion pictures, in Chemical Exposition Auditorium.

TUESDAY, SEPT. 23, 1919

8 a.m.—Departure of members of the American Institute of Mining and Metallurgical Engineers and American Electrochemical Society on an excursion to the steel mills at Gary, Ind.

2 p.m.—Symposium on "America's Case in Chemistry," at Chemical Exposition Auditorium, Ellwood Hendrick, chairman.—Chairman's address.—"Dyestuffs," J. Merritt Matthews, editor *Color Trade Journal*.—"Chemical Porcelain," Herman S. Coors, of Herold China and Pottery Co.—"Laboratory Supplies," lamp-blown glassware and general apparatus, C. G. Fischer, of Scientific Materials Co.—"Instruments of Precision," J. M. Roberts, secretary Apparatus Makers' Association of U. S.—"Fine Chemicals," H. T. Clarke, of Eastman Kodak Co.—"Glassware," "Optical Glass," Harvey N. Ott, of Spencer Lens Co.—"Essential Metal Minerals" and "Pharmaceuticals" will be discussed.

8 p.m.—Motion pictures in Chemical Exposition Auditorium.—"History and Utilization of Coal": 1, "Story of Coal" (four reels) accompanied by discussion by M. F. Leopold, of U. S. Bureau of Mines; 2, "The Manufacture of Beehive Coke" (one reel); 3, "Byproduct Coking With Koppers Ovens" (three reels).—Joint Technical Meeting of American Institute of Mining and Metallurgical Engineers and American Electrochemical Society at Congress Hotel.

WEDNESDAY, SEPT. 24, 1919

10 a.m.—Meeting at Chemical Exposition of American Electrochemical Society, for reading and discussion of the following papers: "The Effect of Amalgamation Upon the Single Potential of Aluminum," by Louis Kahlenberg and John A. Montgomery; "Depreciation in Small Dry Cells With Age," by A. J. Helfrecht; "Manganin," by A. Hunter and J. W. Bacon.—Registration and meeting at Chemical Exposition of Technical Association of Pulp and Paper Industry, in officers' room, First Regiment Armory. Address of welcome. Opening address by president. Report of executive committee. Report of secretary-treasurer. Reports by standing committees.—Meeting at Chemical Exposition of American Ceramic Society.

12:30 p.m.—Adjournment for luncheon of all societies and for inspection of exhibits.

2 p.m.—Joint technical session American Electrochemical Society with American Institute Mining and Metallurgical Engineers at Chemical Exposition Auditorium. Subject: "Ferrous and Non-Ferrous Metallurgy." Among the papers to be presented are: "Electric-Resistance Furnace of Large Capacity for Zinc Ores," by Charles H. Fulton; "Electrolytic Zinc," by C. A. Hauser; "Treating Antimony Ores," by George P. Hulst; "Water and Chlorides in Cement Copper," by Edward Keller; "Chemical and Electrochemical Problems Involved in the New Cornelia Co.'s Leaching Process," by Henry S. Mackay; "Radiant Resistor Furnace," by A. J. Fitzgerald; "Electric Heat in the Typewriter Industry," by A. M. Clark; "Electric Furnace for Experimental Work," by A. J. Fitzgerald. Other papers are in the hands of the American Electrochemical Society Paper Committee for acceptance for these meetings. After meeting is adjourned, the electric furnace exhibits will receive careful inspection.

2:30 p.m.—Adjourned meeting at Chemical Exposition of American Ceramic Society resumed.

3:30 p.m.—Adjourned meeting at Chemical Exposition of Technical Association of Pulp and Paper Industry resumed.

6:30 p.m.—Dinner of Technical Association of Pulp and Paper Industry at Union League Club.

8 p.m.—Motion pictures in Chemical Exposition Auditorium: 1, "Resistance-Type Furnaces for Melting Non-Ferrous Metals;" 2, "Electric Furnaces in the Heat Treatment of Essential War Materials" (both films by courtesy of Electric Furnace Co.); 3, "The Detroit Rocking Electric Furnace in Operation" (courtesy of Detroit Electric Furnace Co.); 4, "Shawinigan Power Development and the Shawinigan Industries" (courtesy of Shawinigan Water & Power Co.); 5, "The American Chemical Society Meeting, April, 1919, at the National Aniline Chemical Co.'s plant, Buffalo, N. Y." (courtesy Community Motion Picture Bureau); 6, "The Making of Cut Glass"; 7, "Manufacture of Glass."

THURSDAY, SEPT. 25, 1919

9:30 a.m.—Meeting at Chemical Exposition of Technical Association of Pulp and Paper Industry, general business meeting.

10 a.m.—Meeting of American Electrochemical Society jointly with American Institute of Mining and Metallurgical Engineers. Symposium on "Pyrometry" at Congress Hotel.

12 m.—Technical Association Pulp and Paper Industry adjournment for luncheon as guests of Sears, Roebuck & Co., to be followed by visit to the paper mill plant.

2 p.m.—Meeting at Chemical Exposition Auditorium. H. E. Howe (Division of Industrial Research, National Research Council), "The Organization and Plans of the National Research Council, With Special Reference to the Industries"; Price Green (Industrial Commissioner, Canadian National Railways), "Fields for Industrial Development, Canadian National Railways"; Henry B. Faber (Industrial Filtration Corporation), "Filtration"; Thomas W. Pritchard (vice-president Fuel Products Corporation), "Destructive Distillation of Bituminous Material With Reduced Vapor Tension and Complete Temperature Control."

4 p.m.—Committee meetings of Technical Association Pulp and Paper Industry at Chemical Exposition.

8 p.m.—Motion pictures at Chemical Exposition. Jam Handy (vice-president Bray Studios), address during show-

ing of first two films: 1, "Formation of Coal Made Visible"; 2, "Chemistry of Gas Engines Made Visible."—American Electrochemical Society smoker at Congress Hotel.

8:30 p.m.—Technical Association Pulp and Paper Industry smoker at Union League Club.

FRIDAY, SEPT. 26, 1919

9 a.m.—Technical Association Pulp and Paper Industry will visit Forest Products Laboratory at Madison, Wis.

9:30 a.m.—Meeting American Electrochemical Society at Chemical Exposition Auditorium. Subject: Symposium on "Catalysis."

12:30 p.m.—Adjournment for luncheon.

2 p.m.—Meeting resumed on "Catalysis" by American Electrochemical Society.

8 p.m.—Motion pictures. Jam Handy (vice-president Bray Studios), "Art Exposes the Invisible in Chemistry," during the showing of special films: 1, "Chemistry in Munitions"; 2, "Chemistry of Photography"; 3, "Invisible Chemistry of the Electric Battery"; 4, "Invisible Phases of Crystallization." Price Green (Industrial Commissioner of Canadian National Railways), "Natural Resources on Canadian National Railways," during showing of stereopticon and motion pictures.—Award of Willard Gibbs Medal to W. A. Noyes, of University of Illinois, by Chicago Section of American Chemical Society.

SATURDAY, SEPT. 27, 1919

9:30 a.m.—Meeting at Chemical Exposition Headquarters of Technical Association of Pulp and Paper Industry for adjourned business session in Auditorium.

Afternoon—Technical Association Pulp and Paper Industry official visits of inspection to exhibits at Chemical Exposition.

2 p.m.—Meeting at Chemical Exposition Auditorium. Symposium on "Safety in Plant and Mine," under chairmanship of M. F. Leopold, safety engineer, U. S. Bureau of Mines.

8 p.m.—Motion pictures, depicting safety work in the plant and mine, by courtesy of U. S. Bureau of Mines.

During the week at the Chemical Exposition there will be shown upon the motion-picture program the following films not already placed by definite dates on this program:

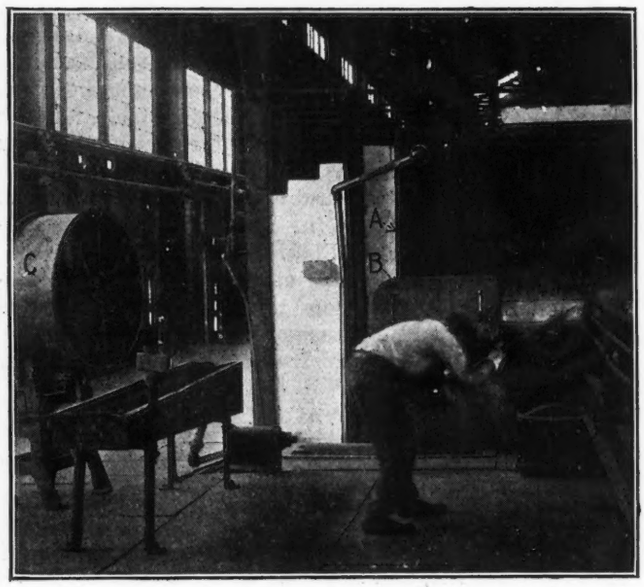
1. "Operation of Koppers Byproduct Coke Plant." (Courtesy the Koppers Co.)
2. "Continuous Motion Conveying, Stacking, Elevating, Loading and Unloading by Brown Portable Handling Machines." (Courtesy Brown Portable Conveying Machinery Co.)
3. "The Manufacture of Zinc Oxide." (Courtesy New Jersey Zinc Co.)
4. "The Making of Matches."
5. "Gold Mining in Canada."
6. "Building a Great Nitrate Industry at Muscle Shoals, Ala., by American Cyanamid Co."
7. "Quarrying Canadian Asbestos."
8. "Manufacturing Rubber Hose."
9. "Making Lime."
10. "The Silk Industry."
11. "The Steel Industry."
12. "The Iron Industry."
13. "The Oil Industry."
14. "Silver Mining in Bolivia."

These are all recently completed films. Others now being made will be finished in time for the exposition. The U. S. Bureau of Mines is completing a large series of films, on the metal and mineral mining and manufacturing industries, showing the progress of the mineral from its situs in the earth to the finished commercial metal or article. The titles of these films were not announced at the time of going to press.

The registration badges of all society members meeting at the exposition will admit them at the doors without other tickets.

Protecting Workmen From Heat

A heating furnace equipped with a water-cooled door, *AB*, in combination with an electric fan, *C*, which is designed to provide ample means for the protection of workmen compelled to work in an exposed position as shown, is illustrated herewith. The increased efficiency from the installation of such devices to alleviate the fatigue resulting from alternate exposure to the furnace heat and comparatively cool room atmosphere has warranted their more general adoption.



USING A WATER-COOLED DOOR AND ELECTRIC FAN FOR HEAT PROTECTION

The photograph is reproduced from the Bulletin of the Bureau of Safety, Sanitation and Welfare of the United States Steel Corporation, and shows the arrangement used at the works of the National Tube Co.

Brass Cartridge Cases for Sale

A million and a half brass cartridge cases are to be offered for sale by the War Department at 20 per cent above the current market price of their metal content. Artcraft manufacturers have advised the Director of Sales that there are many novelty and souvenir uses for these condemned shells.

The offering includes artillery cases of the following sizes: 75-mm., weight 2.61 lb.; 4.7-in., weight 8.25 lb.; 6-in., weight 7.03 lb.; 3-in., anti-aircraft, weight, 6.75 lb.

The Weight Per Rated Horsepower of a combined steam turbine and alternating-current generator is materially less than for a unit made up of a reciprocating steam engine and a generator of equivalent capacity. The floor space and volume space per unit of rated power are also less than for the reciprocating engine generator set. The following table gives approximate figures for a compact steam turbine and generator unit:

Size of Unit, Kw.	Equiv. Hp.	Weight Per Kw.	Weight Per Hp.	Cost Per Kw.	Cost Per Hp.	Cost Per Lb.
200	264	82.5	62	$45.60	$34.3	$0.55
300	402	59.0	44	35.00	26.1	0.593
500	670	43.6	32	27.70	20.7	0.6

The weight of the heaviest piece of the first unit is 4500 lb.; of the second unit 5100 lb.; of the third unit 7500 lb. when prepared for sectionalized shipment. In figuring a given unit, the weight and cost of a condenser of sufficient capacity must also be figured in. The cost figures give first cost only, and do not include freight.

NEWS FROM WASHINGTON

By PAUL WOOTON
Special Correspondent

Tungsten Tariff Bill Passed

By a vote of 171 to 133, the House of Representatives, on Aug. 21, passed the tungsten tariff bill. The measure provides a duty of $10 per unit of tungstic trioxide contained in crude tungsten, ores, and concentrates. On metallic tungsten, tungsten powder, ferrotungsten and other compounds containing tungsten, a duty of $1 per lb. on the tungsten content is provided.

Amendments to the bill reducing the rate of duty were offered at every opportunity by Democrats. Finally on a motion to recommit, the Democrats suggested a 10 per cent ad valorem duty on tungsten ores of all kinds and a 20 per cent ad valorem duty on tungsten powder and ferrotungsten. The motion to recommit was lost, 170 to 138. An important amendment by Representative Green, of Iowa, was adopted. It reads:

That there shall be levied, assessed, and collected upon all tungsten ore and concentrates which have been imported prior to the passage of this act from any foreign country and held or kept within the United States, when such ore has been purchased by the owner thereof at a price less than $17 per unit of tungsten trioxide therein contained, a tax equal to the difference between the purchase price so paid by the owner and the price named above in this section.

This amendment was inserted to meet the most effective Democratic argument made against the bill. It was claimed by the Democrats that millions in profits would be made by the owners of stocks of imported tungsten.

Senate Discusses Leasing Bill

Far more opposition than had been expected developed during the consideration of the General Leasing Bill. Senator La Follette, of Wisconsin, hears that the West is ablaze against the measure as being in the interest of foreign ownership and control of mines. Senator Kenyon, of Iowa, told the Senate that he had been advised that the bill would place the Standard Oil Co. in possession of practically all of the land covered by the bill. Senator Walsh, of Montana, contended that exactly the opposite would be the case and that the Senate would play into the hands of the Standard Oil Co. by failing to pass the bill. Senator Thomas, of Colorado, voiced the feeling of many Western Senators when, in describing his own position, he said:

I am for the bill because I cannot help myself. I am for the bill because it is the only thing that justice can wring from this Congress. It is the only thing the approval of which we can expect upon the part of the Executive. It is the only thing which stands between a good many honest people of the West and bankruptcy. It is the only thing under whose provisions the oil reserves of the West can be developed and the oil itself added to the constantly increasing stream of demand. It is the only source, in fact, to which we can look for an increasing supply of an element which in these days is perhaps more essential to the material well-being and progress of the nation than anything else, unless it be the item of coal.

In view of the feeling that some improvement over existing conditions would be brought about by the bill, and the fact that Senator La Follette, its chief opponent, will be satisfied when he has done his best to get through his amendment, the enactment of the bill into law at this session is practically assured. In the course of the discussion, Senator Ashurst, of Arizona, said:

For ten years it has been utterly impossible for a man of modest means to get an oil claim or a coal claim; it has been utterly impossible for a man, unless he were a millionaire, to get hold of any oil land; and why? A citizen goes out upon the public domain and locates a claim with his strong arm, puts up his monuments, and begins work. It now costs $60,000 to drill an oil well, and one-third of the holes drilled even in proven ground are failures. Moreover, when the citizen locates a claim and complies with the law the Executive power withdraws the land. President after President seem to fall under the same baleful view that we must conserve the resources of the country by taking them from our people.

Records of the War Industries Board

All records of the War Industries Board have been transferred to the Council of National Defence. These records will be available to those interested. This excepts, of course, the data submitted to the War Industries Board in confidence. The policy in regard to the records is outlined by the council as follows:

The War Industries Board was originally created by the council, and remained under its direction for nearly a year. Since the records deal in such a vital way with the American industrial and economic capacity for war, they are naturally reassigned to the council, which, as a permanent body, is charged by the Congressional act creating it with the coordination of industries and resources for the national security and welfare. It is the intent that these and similar war records shall, as material bearing directly upon the national defence, be carefully studied and catalogued by the council, not only to preserve in the most coherent form the lessons learned from the war on the industrial and economic side, but to make the data quickly and effectively available against future emergency. It is also the intent to make the records available to American business wherever proper to do so, though, of course, all confidential information given to the council and the War Industries Board throughout the war days will be scrupulously safeguarded. The director of the council has initiated steps to organize these records for their most efficient use.

Assessment Bill Signed by the President

The President has signed the bill providing for the suspension of annual assessment work during 1919. As already reported in the *Journal*, this provides that no such suspension shall be granted to any one claimant for more than five claims. It is also provided in the bill that "every claimant to obtain the benefits of this resolution shall file or cause to be filed in the office where the location notice or certificate is recorded, on or before Dec. 31, 1919, a notice of his desire to hold his mining claim under this resolution."

By The Way

Fluorspar and the Liberty Loan

The steel industry obtains a large percentage of its fluorspar requirements from the district of which Marion, Ky., is the center, says *Iron Trade Review*. In Crittenden County, in fact, of which Marion is the seat, the principal industry is the mining and shipping of fluorspar. In the Victory Loan campaign, the Crittenden County Liberty Loan committee obtained a huge oversubscription, with the result that it was given the privilege of naming a vessel to be launched from the huge Government yard at Hog Island. Accordingly, the committee decided to name the vessel "Fluorspar." The ship took the water at Hog Island on June 16, its sponsor being Miss Frances Gray, of Marion, Ky.

A High Turnover

"I once had a partner," wrote Dan De Quille, "whose one dream of life was to be able to turn a flapjack. If he could only flip one into the air and catch it all right, he thought he would be happy, whether the diggings paid or not. One day he announced he would turn one in the air or die. Taking hold of the handle of the frying pan with both hands, and getting out into the middle of the floor, he hustled the cake about in the pan until it was loose on all sides. Then, squatting nearly to the floor and giving a mighty heave, he sent the pancake flying upward. This done, he stood, frying pan in hand, ready to catch the cake. But that pancake never came down; it struck batter-side against the ceiling, and there it stuck as fast as the wafer on a love letter."

Passing of the Single Jacker

The revolutionary effect of the machine drill upon the mining craft was strikingly illustrated at the Fourth of July celebration held in Wallace, Idaho, last month. "A few years ago," writes our Wallace correspondent, "the big event of Independence Day in the mining districts was the rock-drilling contest. It was typical of the industry, and among all the sports and contests received the largest purse. Every mine had its crack drill team, and the entire force turned out to back it with noise and cash. Generally, a liberal purse was offered for 'single jackers' also. This year the people of Wallace decided to revive this old-time contest and offered a purse of $500, open to all comers, believing that it would attract many contestants from the Coeur d'Alenes and from Montana and more distant places. In this they were disappointed, for only two local teams entered. Ten years ago there would have been a dozen entries. The machine drill has done its work. No more purses will be offered in Wallace for hand-drilling contests."

The Deepest Well

Named in the order of depth, the four deepest wells in the world are the J. H. Lake, 7,579 ft.; the Goff, 7,386; a well at Czuchow, Germany, 7,348; and the R. A. Geary, 7,248 ft., according to the U. S. Geological Survey.

The R. A. Geary well, of the People's Natural Gas Co., is about four miles northwest of McDonald, Pa., and about twenty miles southwest of Pittsburgh. The mouth of the well is about 1,050 ft. above the sea level. The well penetrates the Gordon stray sand, the last of the usual gas sands in this region, at a depth of 1,971 ft. From this point to a depth of 6,700 ft. the strata penetrated are alternately "lime" and "slate," and from 6,700 ft. to the bottom, 7,248 ft., they are "sand" and "lime" interspersed with about 60 ft. of rock salt. The second deep well was drilled by the Hope Natural Gas Co. on the farm of M. O. Goff, about eight miles northeast of Clarksburg, in northern West Virginia. Its mouth is 1,164 ft. above sea level. The well begins 200 ft. below the level of the Pittsburgh coal and penetrates the usual oil-bearing and gas-bearing sands, the lowest being the Bayard, which lies at a depth of 2,210 ft. The strata in the remainder of the well are alternately "lime" and "slate." The J. H. Lake well, of the Hope Natural Gas Co., is about eight miles southeast of Fairmont, W. Va. It is about twenty miles north of the Goff well and about sixty miles south of the Geary well. The mouth of the well is about 1,300 ft. above sea level. The Bayard sand, the lowest of the gas sands, was found in this well at a depth of 2,050 ft. The remaining strata are alternately "lime," "slate," and "sand." A bed of ocean water was found in the Geary well at 6,260 ft.

Food for Thought

"Well, Mister Clancy," said Bill, licking the broken wrapper of a near-Corona, "what do ye know about profiteerin'?" The shift-boss flushed guiltily as he denied any complicity with the timekeeper. "Ye misunderstand me intirely;" replied the super, making a mental note of the bit of circumstantial evidence. "'tis about this here food question I'm talkin'. Some fellies wud have it that a boonch av these warehouse speccilators an' delicatessen clerks ought to be taken out in front av a firin' squad. Wan sez that the big manipilators keep storin' up a heavy surplus; while another sez the middlemen an' retailers are pullin' down all the crooked graft; an' still another sez the blame shud be put on a minin' ingineer that tuk pity on the poor downtrodden farmers. Now, mebbe they're all right an' all wrong to wanst. Have ye not rayflicted that pathriotism is at the bottom av it all. Ye'll raymimber that the dimmycrats, foreseein' the need av plinty av pork, figured out the income tax to eddicate us in complex arithmetic an' cut down our dhrink money. Whin insults made us forget the kind of mollycoddle pride that had kept us out av war, the need av more pork was noticed. More income tax an' folks began to holler. Some hollered that food wud win the war, some hollered that pathriotism wud win the war, an' some just began to feel holler. The pathriots that knew how to figger the best saw that the more profits they cud make, the bigger percintage the guv'mint wud get on the income tax; so they kept gettin' more an' more pathriotic. Food seemed the nacheral way to make the surest profits, for ivery wan must eat. A man can go barefut, he can wash his last year's straw hat, but food he must have or he can do no work. Speakin' av food, the keeper av the boardin' house tells me that thim six new muckers ye've had on the gravevard shift for the last tin days niver ate but the wan meal. Pork is all right in its place, but sometimes it's harrd to digest. Whin there's anny surplus av it around this mine, I'll start a little cannin' facthr'y."

NEW PUBLICATIONS

The Kantishna Region Alaska. By Stephen R. Capps. Paper, 6 x 9; pp. 116, illus. Bull. 687, U. S. Geological Survey, Washington, D. C., 1919.

Contributions to Economic Geology (Short Papers and Preliminary Reports) 1918. Part I.—Metals and Nonmetals Except Fuels. F. L. Ransome, E. F. Burchard and H. S. Gale, Geologists in Charge. Paper, 6 x 9; pp. 147, illus. Bull. 690, U. S. Geological Survey, Washington, D. C., 1919.

Mexico Under Carranza. By Thomas E. Gibbon. Cloth, 5 x 7½; pp. 270. Doubleday, Page & Co., Garden City, N. Y., 1919.

Mr. Gibbon's book could not have been more timely, but what is more to the point, the subject is handled in such a manner that the contents appeal to one as bearing the stamp of accuracy as to statements of fact, and the conclusions have been carefully and logically reached, and as convincingly presented. A mass of intensely interesting data is condensed into a small space. One who knows Mexico will find the book of interest, in that it will confirm and strengthen the views he already has, adding much to his knowledge of the history of the country and its people. We would recommend the book more particularly to those who do not know Mexico and care little about it. One evening spent with this volume would convince the most disinterested that the United States has a duty to perform, a duty that is pressing and of immediate importance.

The Iron Hunter. By Chase S. Osborn. Cloth, 5½ x 8; pp. 316, illus. The Macmillan Co., New York, 1919.

The over-critical reviewer might take exception to the title assumed by Mr. Osborn in the presentation of his autobiography, but viewed in the light of a narrative embracing the life story of a virile, active man, a lover of the great out-of-doors, and a keen observer of human nature, the title is aptly given, and could well be applied, even supposing all references to iron ore were omitted. Interspersing his personal experiences, adventures, and opinions, Mr. Osborn has included a wealth of information concerning the formation, mining, and treatment of iron ore in many districts, and has produced a happy combination which carefully avoids the dryness of a strictly technical publication, although partaking of the nature of a valuable addition to the history of iron and steel. Though disclaiming the expert knowledge of the astute technologist, Mr. Osborn displays in all of his references to iron ore a well-founded knowledge of the subject. Of particular interest to the iron-ore student is the chapter dealing with the mining and treatment of siderite at the Magpie mine, in the Michipicoten district.

Timber, Its Strength, Seasoning, and Grading. By Harold S. Betts. Cloth, 6 x 9; pp. 234, illus. McGraw-Hill Book Co., New York, 1919.

This book is intended for engineers, manufacturers, users of lumber, and students of engineering and forestry. The author presents in readily accessible form much technical information regarding wood, similar to that available on other structural materials.

The data given are derived mostly from tests and investigations on the mechanical properties of wood made by the Forest Service of the U. S. Department of Agriculture. Various bulletins, circulars, and papers of the Forest Service, especially those prepared by the author and those with the preparation of which the author was closely concerned, have been drawn upon freely. Most of the diagrams have already appeared in Department of Agriculture publications.

The book contains a review of the timber resources of the United States, and data on the strength of wood, with results of tests on North American woods, relations indicated by the tests, and the methods of conducting them. The author discusses the effect of moisture and of preservative and conditioning treatments on the strength of wood, the seasoning of wood, and the strength of wooden products. A chapter is devoted to the principles of lumber grading, and the presentation of the rules governing the grading of lumber by manufacturers' associations. Statistics on lumber produced and used in the United States, in the manufacture of wooden products, form a valuable feature of the work, which is well written, and profusely illustrated with halftones, line cuts, diagrams, graphs, and tables.

Graphic Methods for Presenting Facts. By Willard C. Brinton. 7¼ x 10¼; pp. 371; illus. The Engineering Magazine Co., New York.

The engineer accustomed to the construction and interpretation of curves will, on glancing through this book, be impressed with how little he knows about the graphical presentation of facts. We are familiar, of course, with the picture of the big market basket showing what a dollar would buy before the war, standing alongside the diminutive cut of what we can buy for the same amount today. Few of us realize, however, how many different ways there are of picturing information and how much better some of them are than others. This is Mr. Brinton's object in publishing his book, which is illustrated by over 250 examples of various graphical methods of stating facts.

The mining or metallurgical engineer must not expect a book at all like "The Construction of Graphical Charts," by Peddle. Mr. Brinton's work is intended for the advertising man, for the social worker, the business man, the legislator, and the statistician. Mathematics has been entirely eliminated. At the same time there are many valuable suggestions in the principles here discussed.

The author says: "We daily see facts presented in the hope of creating interest and action for some really worthy piece of work to benefit the people as a whole. In many of these cases the attitude of the person presenting the matter seems to be that the facts will speak for themselves and that they need little or no assistance. Ordinarily, facts do not speak for themselves. When they do, the wrong conclusions are often drawn from them. Unless the facts are presented in a clear and interesting manner, they are about as effective as a phonograph record with the phonograph missing."

There is some information directly applicable to the engineer. For example, Mr. Brinton states: "For most statistical work it is much better to join the points (of a curve) showing the observations by straight lines without any attempt to draw smooth curves. Smooth curves would, by their smoothness, imply a degree of accuracy in the data much greater than would ordinarily be justifiable. By using the straight lines instead of the smooth curves to connect points, the reader is warned that the chart represents facts as found, rather than facts which are assumed to be in accordance with any definite laws."

Emphasis is also placed, and rightly, on the fact that too often statistical data are given to the unit figure and sometimes even to decimals, thus implying an accuracy far greater than it is possible to obtain. A report which states that your mine contains 874,367 tons of ore of an assay value of $11.26 shows that the one who made the report, to say the least, has not much idea of the general fitness of things.

It is hard to discern, in such a mass of material drawn from so many different sources, how examples of such familiar things to the mining fraternity as contour maps, mine models, and metallurgical flow sheets should have been omitted from the book. However, these would not be missed unless one were looking for them. The book is really very complete and well arranged, considering the character of the subject.

A feature to which the author does not refer, but which the casual reader is bound to notice, is the interesting and varied character of the information given by the charts. Graphical methods are used to show everything, from the production of copper in different countries for one year to the probable span of a daughter from finger-tip to finger-tip for any given span of the mother. The book is a veritable illustrated "World Almanac."

PERSONALS

CHARLES M. SCHWAB was recently decorated as a chevalier of the Legion of Honor by the French Government in recognition of his services during the war. The event took place on Mr. Schwab's estate in Loretto, Pa., and was attended by a large gathering. M. Casenave, French Minister Plenipotentiary, conducted the ceremonies.

Frederick W. Foote left for Cuba recently on professional business.

A. P. Watt has returned to New York after a trip to Canada.

Charles A. Chase was in Silverton, Col., recently on professional businees.

Herbert S. Kohlberg is in New York. His address is 108 West 43d St.

C. J. Garvin has returned to Arvada, Col., after an extended trip through the Northwest.

Robert A. Bryce, of Toronto and Cobalt, recently examined placer properties in Cariboo, B. C.

S. F. Shaw is inspecting properties at Zacateca City, Mexico, and Asientos, Aquascalientes.

Van. H. Manning, director of the U. S. Bureau of Mines, was in San Francisco Aug. 15-18.

Bulkeley Wells arrived in Ouray, Col., on Aug. 5, en route to the Genesee mining group, near Red Mountain, to inspect that property.

Fred G. Farrish, geologist of the Smuggler Union Mining Co., Telluride, Col., left for Durango during the early part of August.

R. P. McLaughlin has been reappointed as California State Oil and Gas Supervisor for a term of four years.

Leonard Wojomir Orynski, lieutenant in Engineer Reserve Corps, has returned to San Francisco from France, where he served fifteen months.

J. P. Hutchins has been at Constantinople since May 22. Mr. Hutchins has made two trips to Baku, and intends to go to Odessa soon.

Major D. G. Irions, mining and metallurgical engineer, has accepted a position in the mail-order circulation department of *Engineering and Mining Journal*. Major Irions has recently been discharged from military service.

W. M. Drury, M. B. Stewart, and **H. Cooper** are visting properties of the American Smelting & Refining Co. at Angangueo, Michoacan; Asientos, Aquascalientes; Charcas, S. L. P.; and Matehuala, S. L. P.

S. G. Blaylock, assistant manager of the Consolidated Mining & Smelting Co., has been appointed general manager, in the place of **J. J. Warren**, who was recently elected president of the company.

Arthur D. Lakes and **Roy E. Clark**, of Spokane, are in the Republic district in Washington in connection with the suit of the Northport Smelting and Refining Co. vs. Last Chance Mining Co., involving apex rights.

Major R. A. Black, mining engineer, who was with the Australian forces in France, has gone to Northern Manitoba to inspect and report on properties owned by the Produce Trust & Loan Co., of London, England.

Vincent Ferguson, who for eighteen years has been manager of the Bessemer plant of the U. S. Cast Iron, Pipe, and Foundry Co., resigned his position on Aug. 12. Mr. Ferguson will be succeeded by **Gordon E. Jones**, manager of the company's Anniston, Alabama, plant.

Carl A. Davis has resigned his position as general manager of the Brakpan Mines, Ltd., to accept the appointment as consulting engineer to the Consolidated Mines Selection Co., Ltd., and the Anglo American Corporation, Ltd., both of Corner House, Johannesburg, South Africa.

Photo by Underwood & Underwood.
CHARLES M. SCHWAB

Leonard B. Miller, of the ore firm of Oglebay, Norton & Co., Cleveland, Ohio, has returned to his duties after an illness of two and one-half years. Mr. Miller was in charge of the company's mining operations when taken ill.

Joseph Keele, of the Canadian Geological Survey, is examining the area north of Cochrane, Ont., along the proposed extension of the T. & N. O. Ry. to Hudson Bay, to ascertain if conditions are favorable to the occurrence of oil.

S. Harbert Hamilton, mining geologist, of Overbrook, Pa., is engaged in studying the magnetic iron ores of east Tennessee. The results will be published as a monograph by the State Geological Survey of Tennessee under the direction of Wilbur A. Nelson, State Geologist.

A. W. Carroll, G. E. Fulton, and **M. H. Merriss**, of the Raritan Copper Works, Perth Amboy, N. J., recently made a business trip through the West lasting several weeks, in the course of which they visited many of the large mines and smelteries.

Horace B. Patton announces that he has removed his office from his residence at Golden, Col., to 911 Foster Building, Denver, where he will continue the practice of his profession as geologist, devoting special attention to examination of oil and gas properties, and to ore deposits.

OBITUARY

J. P. Johnson, formerly of the staff of the *South African Mining and Engineering Journal*, died recently at the age of thirty-eight years. Mr. Johnson was educated at Duwich College and at the Royal School of Mines. After leaving there, he was employed at the Dolcoath and Tincroft Mines, Cornwall, leaving in 1903 to go to South Africa, where he was connected with the Jumper's Deep Mine and subsequently with the Saxon group of mines. Later he was engaged in surveying the Roberts Victor Diamond mine and in prospecting certain areas in Orange River Colony for the Vindex Diamond Syndicate. Mr. Johnson eventually established himself in Johannesburg as a consulting mining engineer and geologist. He came to be an authority on diamondiferous properties, and was frequently engaged in expeditions in various parts of South Africa, north of the Transvaal, in Griqualand West, and elsewhere. His mining experiences were published in a series of monographs, and his books on "The Ore Deposits of South Africa" and "The Mineral Industry of Rhodesia" are standard works. He was on the Council of the Geological Society of South Africa.

SOCIETIES

Spokane Association of Engineers will inspect the mines of Stevens County, Wash., on the annual excursion Sept. 12 and 13.

Northwest Mining Association will hold a session Sept. 4 in Spokane. Frank C. Bailey, secretary, says the proposed establishment of a National Department of Public Works will come up for indorsement.

National Safety Council will hold the eighth annual safety congress in Cleveland, Oct. 1 to 4. Approximately 3,000 men and women are expected to attend, and 160 speakers are scheduled to make addresses. There will be four general sessions and thirty-five sectional meetings. The metals and mining sections each hold three meetings.

American Petroleum Institute held a meeting of the board of directors in Colorado Springs on Aug. 26 in connection with research work being conducted in the laboratories, in methods of refining oils and in perfecting field operations. Among those present were Henry M. Blackmer, president Midwest Refining Co., chairman of the meeting; Captain John Barneson, president of the General Petroleum Co.; Walter C. Teagle, president of the Standard Oil Co., of New Jersey; A. C. Bedford, chairman of the board of trustees of the Institute; E. L. Doheny, president of the Pan-American Petroleum Co.; Henry L. Doherty, president of the City Service Co.; J. W. Van Dyke, president of the Atlantic Refining Co.; Harry F. Sinclair, president of the Sinclair corporations; Van. H. Manning, director of the U. S. Bureau of Mines; Thomas A. O'Donnell, who served as assistant director of the Petroleum Division of the U. S. Fuel Administration during the period of war; and K. R. Kingsbury, president of the Standard Oil Co. of California.

INDUSTRIAL NEWS

The Jeffrey Manufacturing Co., Columbus, Ohio, has opened an office in the Book Building, Washington St., Detroit, Mich., in charge of O. B. Westcott.

The Denver Engineering Works Co. has recently contracted for the exclusive manufacture and sale of commercial sizes of the Samson crusher.

Walter E. Becker, formerly of Becker & Smith, contracting engineers and sales agents, has completed arrangements to assume the position of general manager of the Layne & Bowler Co., pump manufacturers, and will be situated at Memphis, Tenn.

The Lunkenheimer Co., Cincinnati, Ohio, announces its intention to increase its manufacturing facilities by the erection of a complete plant at a cost of about $2,000,000. The site comprises about 70 acres situated in Carthage, a suburb of Cincinnati.

Eugene P. Reading, having severed his connection with Hubbard-Floyd Co., of 90 West St., announces the formation of an organization under the firm name of Reading Engineering Co., Inc., for the purpose of carrying on a general equipment business, with offices in the Tribune Building, New York City.

Richardson-Phenix Co. announces the appointment of L. E. Strothman as vice-president and general manager. J. W. Peterson will become president and treasurer. Mr. Strothman was formerly connected with the Allis-Chalmers Manufacturing Co. and the Nordberg Manufacturing Co. He was appointed associate member of the Naval Consulting Board in 1916.

Western Research Corporation, Denver, Col., has issued a pamphlet describing the field of activity covered by the organization in laboratory research, ore testing, and mine examination. A financial department has been organized to act as a clearing house in selecting mining properties of merit and to prepare properties for investors. Various engineering tables and other technical data are included.

The R. D. Nuttal Co., Pittsburgh, Pa., has carried on considerable experimental work in order to perfect mine locomotive gearing having the requisite hardness to withstand long wear, together with a sufficient toughness to avoid breakage. It is claimed these qualities are combined by special heat treatment, resulting in better gears.

TRADE CATALOGS

Jeffrey Straitflo Ventilators. Jeffrey Manufacturing Co., Columbus, Ohio. Bulletin 270; 7½ x 10½; 8 pp.; illustrated. Describes a mine fan which is claimed to eliminate the back flow when operating against pressure, with consequent loss of power.

United States Civil Service Commission announces open competitive examinations for the positions of superintendent of melting shops and superintendent of forge shops at a salary of $5,000 a year each. Applicants should apply for Form 1,312 to the Civil Service Commission, Washington, D. C.

Condenser Tubes. Wheeler Condenser and Engineering Co., Carteret, N. J. Pamphlet entitled "What Worried Admiral Jellicoe Most," which discusses the importance of condenser tubes. Several tables of dimensions and weights of seamless brass and copper tubing, and a price list, are included.

Holbeck Pulverized Coal Systems. The Bonnot Co., Canton, Ohio. Catalog; 8½ x 11; 136 pp.; illustrated. Describes the use of powdered coal as a fuel, using air as the carrying agent, and various mechanical arrangements required in the system. Some installations in large plants are also described. Fuel and labor saving are discussed.

Refractories. Los Angeles Pressed Brick Co., Los Angeles, Cal. Catalog; 4 x 6¾; 48 pp.; illustrated. Describes various standard and special shapes of fire brick manufactured by the company, including general information on refractories. Tables for the calculation of brick work and on high temperatures involved in metallurgical processes are also given.

Pelton Water Wheels. Pelton Water Wheel Co., San Francisco and New York. Bulletin No. 12; 7¾ x 10½; pp., 48; illustrated. Describes impulse water wheels of the Pelton type and in general the Pelton system of power. A section is also devoted to a discussion of hydraulic pipe lines and their construction and to Pelton centrifugal pumps. A table of working heads and weights of riveted steel pipes is included, as are pipe-friction tables.

NEW PATENTS

U. S. patent specifications may be obtained from the Patent Office, Washington, D. C., at 5c. each.

Belt Conveyor. William Kingman Page, assignor to Chile Exploration Co. (1,313,111; Aug. 12, 1919.)

Blast Furnace—Method of Preventing Gas Explosions in Blast Furnaces During Temporary Stops. John W. Dougherty. (1,309,466; July 8, 1919.)

Blasting—Safety Cartridge for Mining Purposes. Emmanuel Lemaire. (1,310,666; July 22, 1919.)

Classifier. Edward F. McCool. (1,310,917; July 22, 1919.)

Converters—Attachment for Forming Tuyère Openings in Converters. Michael Zippler. (1,310,230; July 15, 1919.)

Crusher—Jaw Crusher. Ray C. Newhouse, assignor to Allis-Chalmers Manufacturing Co. (1,309,807; July 15, 1919.)

Crushing—Gyratory Crushing Apparatus. Joseph E. Kennedy. (1,310,798; July 22, 1919.)

Dewatering — Apparatus for Dewatering and Separating Ores, Sands, Etc. Lewis H. Falley. (1,312,027; Aug. 5, 1919.)

Dredge-Bucket Lip. Lewis D. Hopfield. (1,310,570; July 22, 1919.)

Dredge Buckets, Latch for. Eugene J. Moynihan. (1,310,030; July 15, 1919.)

Drill—Underground Portable Drill. Willie F. Branning. (1,310,274; July 15, 1919.)

Electrode. E. A. C. Smith. (1,311,096; July 22, 1919.)

Electrolytic Method of Recovering Metals From Their Ores. Dell F. Harbaugh. (1,306,480; June 10, 1919.)

Excavator Bucket. Eugene J. Moynihan. (1,307,747; June 24, 1919.)

Filtration—Process of Treating Mixtures of Liquids and Solids. Michael H. Kuryla, assignor to Merrill Metallurgical Co. (1,302,814; May 6, 1919.)

Fuel — Apparatus for Storing and Handling Pulverized Fuel. William Oran Renkin, assignor to Quigley Furnace Specialties Co. (1,308,367 and 1,308,369; July 1, 1919.)

Magnesium — Electrodeposition of Magnesium. George O. Seward, assignor to American Magnesium Corporation. (1,310,449 and 1,310,450; July 22, 1919.)

Magnetic Separator. Robert A. Manegold and George H. Fobian, assignors to Dings Magnetic Separator Co. (1,310,802; July 22, 1919.)

Manganese Steel, Manufacture of. R. A. Hadfield. (1,310,528; July 22, 1919.)

Mica From Feldspar, Process of Separating. George J. Bancroft. (1,310-939; July 22, 1919.)

Molybdenum-Tungsten Alloy, Manufacture of. Frederick G. Keyes, assignor to Cooper Hewitt Electric Co. (1,308,907; July 8, 1919.)

EDITORIAL CORRESPONDENCE

Current Events and Topics in Brief of Interest to Engineers and Operators

DENVER, COL.—Aug. 23

Mining Activity in Park County is rapidly increasing and the old silver producers of this district are attracting attention. A sale of the Russia Mine has just been consummated and a substantial first payment has been made. This property has a record in production of over $1,000,000 in high-grade silver ore and the dumps and old stopes are filled with good grade milling ore. Recent work has opened another orebody which may prove of considerable importance. The property which was owned by the estate of G. W. Brunk has been purchased by K. C. Huston, who represents a large Eastern company which will undertake extensive operation at once and will build a mill for the treatment of the lower grade ores. The work on the property of the Reserve Mining Company has progressed to the point of production. The lower tunnel has been reopened and retimbered and ore for shipment to the smeltery is now being saved.

The Louisiana-Colorado Mining Company is operating both the mine and the mill—a force of about forty men is employed in and around the mine and the mill is working at its full capacity of 150 tons per day. A carload of high-grade concentrates is now ready for shipment to the smeltery. These concentrates carry a high percentage of lead and in the neighborhood of 200 oz. of silver to the ton.

The Commonwealth Mining Company has a small force of men working on the Magnolia Mine on North Star Mountain. The London Mining and Milling Company, driving a new crosscut tunnel, will reach the vein with 100 ft. of additional driving. The work is being pushed as rapidly as possible with two Leyner drills working abreast in the tunnel heading. About thirty-five lessees are employed in the old South London workings and are keeping the teams of the district busy hauling the ore to the railroad. The Victory Mining Company, having leased the entire North London workings, is remodeling the mill into a cyanide plant—a large force of men is employed and the work is being rushed with all possible speed.

Joseph Castle and associates, of Denver, have purchased from George Shelton, of Alma, a lease and option on the Sweet Home Group in Buckskin Gulch. Operations have been started and a good showing of ore is reported.

The Silver Gem Group on Mount Bross adjoining the Dolly Varden and Moose properties has been taken over by Ernest Montgomery and associates, of Denver. This property covers the same contact as the neighboring properties and has a good record as a silver producer.

The Sacramento Chief mine is being equipped with machinery in preparation of continuing the sinking of the shaft. The ore showing at present is said to be excellent. The Sun-Moon Leasing Company has a large force of men employed on the Hill Top, and a mill for the treatment of the low grade ore is in contemplation. A large body of lead carbonate ore has recently been opened, from which a steady production of smelting grade ore will be maintained as soon as the railroad between Fairplay and Leavick is repaired and put into shape for operation.

The Whale mine and mill at the head of Halls Valley are being operated with a full force. The milling of the ore by flotation is proving a decided success. Lessees are now operating in a small way the Atlantic and Pacific, Champaign, King Oscar, Kennebec, Paris, Red Lion and other properties throughout the district.

The Yuba Dredging Company, which has been testing the ground near the town of Fairplay for the last three years, has let a contract for the excavation of a dredge pit, which is to be 150 ft. square and 10 ft. deep. It is rumored that three dredges are to be installed as rapidly as possible, all of which are to be boats of larger capacity than any now in operation in Colorado.

Messrs. Rhoades and Goldburg, of Chicago, who have purchased the placer and lode mines formerly owned by the Green Mountain Mining Company, are at Alma planning for extensive operations to be started next spring. Plans are also being formulated for testing by churn drills the placer ground between the towns of Alma and Fairplay for the purpose of installing dredges.

OURAY, COL.—Aug. 23

Revival of Mining in the San Juan district is making progress; though somewhat slow, it is none the less apparent, in the new operations around Silverton, Telluride, and Ouray. At Ouray, the Ironton-Red Mountain section is showing considerable activity. The Summit Copper Mining Co., Red Mountain, has a considerable quantity of copper-silver ore which has long needed a milling plant. The property was recently examined by Kirby Thomas, of New York, and mine repair and development work is now in rapid progress. Some milling apparatus was recently bought and hauled to the property, and it is understood that the company will probably build a mill this autumn or next spring.

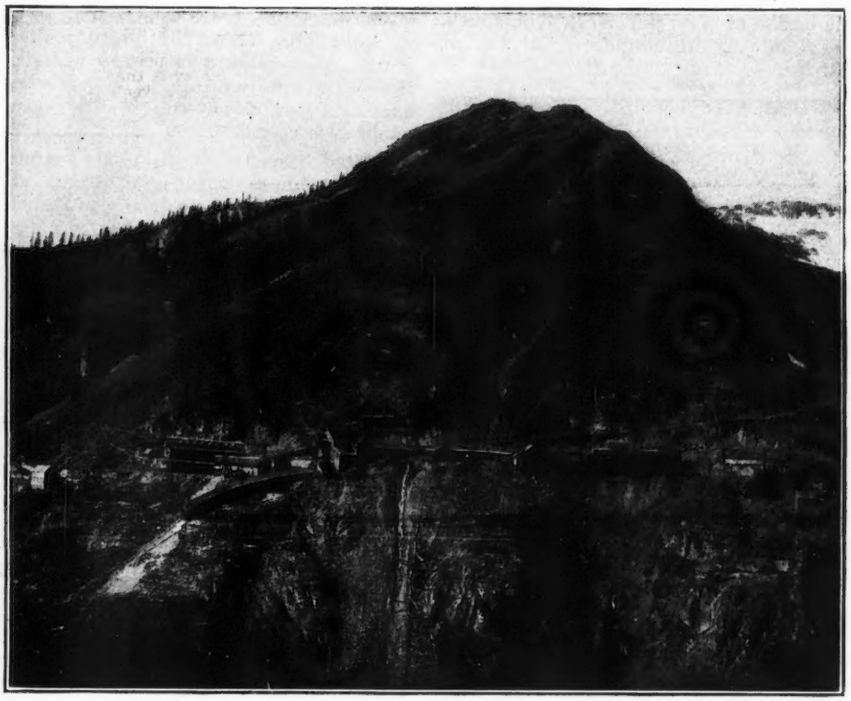
The Red Mountain Mines Co., Ironton, in charge of George E. Collins, of Denver, has been developing and repairing some of the famous old Red Mountain copper-silver mines, notably the Genesee, Yankee Girl, and Joker Tunnel. The Yankee Girl shaft is now being unwatered, being open to the 11th level. A small mill has been about completed and may operate this season. An examination by Bulkeley Wells, with Fred Farish and Wilbur Grant, his engineers, has resulted in the announcement that Mr. Wells has taken an active interest in this company.

The Barstow mine, Ironton, continues shipments of high-grade gold concentrates made on the property, from the recent strike of gold ore.

The Ouray Consolidated Mining & Refining Co. has bought an interest in the company operating the old Guadeloupe mine, and is completing a mill at Ironton. A line has been cleared for an aerial tram and a compressor was placed at the mine. Last winter a good strike of heavy copper-silver ore was made, and some good shipments resulted.

Recently, the A. E. Ackerson lease on the Guadeloupe struck more of the high-grade ore, 600 ft. further south than the first strike, and indications are good for a considerable production. The company expects to have its mill operating this autumn, when the tram is completed, treating not only Guadeloupe but several other ores in the vicinity, taking some custom ore.

The White Cloud Mining Co. has unwatered its shaft and is now diamond drilling from the shaft in search of the orebody, which is one of the old Red Mountain "chimney" type.



BULLION TUNNEL, SMUGGLER UNION MINE, TELLURIDE, COL. LOOKING WEST ACROSS MARSHALL CREEK

ISHPEMING, MICH.—Aug. 23

The Dock Workers Refuse to Work at Marquette, Escanaba and Ashland, despite the fact that E. D. Brigham, of Duluth, who is in charge of ore, grain and coal movements for the Government in the Northwest, has informed them that if they do not return to their places the docks might be closed indefinitely. Most of the men employed at Duluth, Two Harbors and Superior went to work after Mr. Brigham issued his statement, but the men at the Michigan docks followed the advice of the union officials and refused to go to the docks until their claims had been satisfied. It is difficult to state what action will be taken by the Railroad Administration. A few men were engaged for work on the L. S. & I. dock at Marquette, and two boats were loaded there with Marquette range ore this week. Only a few shipments have been made from the mines in over two weeks, and most of the mines are again stocking. The extra cost to the operators will be high, as it requires considerable money to stock ore and then load it again for shipment to the Lake ports, and this must be done or discontinue operations underground. The dock workers are demanding 64c an hour, with

time and a half for overtime, and recognition of the union. Mr. Brigham stated that their claims would be presented in Washington and that the men could just as well be working while a settlement was being made as to have the boats tied up in port. Three wheelsmen had to be discharged at Marquette because they refused to sail on a boat which had been loaded by non-union labor, but the boat owners had little difficulty in getting three men to fill their places. The outlook is certainly not encouraging for the operators of the mines, as they have not succeeded in disposing of a great deal of ore this season, sales from the Michigan field being exceptionally light, and they want to at least move what has been sold. It is to be hoped that the strikers will soon awake to the realization that they can gain nothing by remaining away from work, and that shipments can be resumed.

DULUTH, MINN.—Aug. 23

Shipments of Iron Ore from the Lake Superior district had fallen off 4,427,085 tons on Aug. 1, 1919, as compared with a corresponding date in 1918. The embargo imposed on ore shipments Aug. 8 because of the strike of the railway shopmen has been raised slightly and spasmodically because of the return of those men. The strike of the coal dock men occurring at the same time is still in effect and is threatening to tie up both railroads and mines for lack of fuel. Independent operators are shipping such ore as is required to care for boats tied up at the head of the Lakes, but the Steel Corporation has shipped practically no ore since the placing of the embargo. Coal dock owners at a meeting held in St. Paul on Aug. 21 decided to bring suit against Local No. 524, of Duluth, and Local No. 163, of Superior, of the International Brotherhood of Electrical Workers, alleging conspiracy to prevent men from working on the coal docks of those cities. Granting an early adjustment of all matters now tending to retard shipments, the season will have to become one of great activity in order to approach the tonnage moved in 1918.

Shipments in tons to Aug. 1, 1918 and 1919, follow:

Dock and Harbor	Shipments, 1918	Shipments, 1919
C. & N. W., Escanaba	2,012,781	1,804,424
C. M. & St. P., Escanaba	830,096	617,139
D. S. S. & A., Marquette	387,891	236,568
L. S. & I., Marquette	1,296,128	855,158
C. & N. W., Ashland	2,849,925	2,489,673
Soo Line, Ashland	523,190	455,172
G. N., Superior	5,768,718	4,602,112
Soo Line, Superior	863,968	649,087
N. P., Superior	418,558	235,269
D. M. & N., Duluth	9,913,087	9,821,136
D. & I. R., Two Harbors	4,744,591	3,616,110
Totals	29,608,933	25,181,848

SALT LAKE CITY, UTAH—Aug. 23

Metal-Mine Insurance Rates for Utah operators under the Workmen's Compensation Act have been lower than the first figure fixed by the insurance companies for the present year, in view of increased payments to injured workmen provided for by amendments to the law. The multiplier 2.72 will be used, instead of 3.15, and in the former as in the latter case 1c. per hundred dollars of payroll added. Last year $632,000 was paid in premiums, according to the Insurance Commissioner for the state; and although this year more companies are self-insuring than last, premiums for this year with the multiplier 3.15 would, it is estimated, amount to about $740,000. With the multiplier of 2.72 there will be a reduction of about $95,000 from the latter figure. Insurance companies are making arrangements to settle in various ways the matter of excess premiums already paid this year.

SPOKANE, WASH.—Aug. 23

Metal Production in Washington will probably increase as conditions adjust themselves to normal times, but the output during the first half of 1919 was seriously curtailed by the drop in prices, according to the U. S. Geological Survey. The metal output in 1918 was $1,467,421, a decrease from $2,289,285 in 1917. The present rate of shipment indicates there will be a decided decrease in the output of gold, silver and lead in 1919.

BOISE, IDAHO— Aug. 22

Laws and Regulations Pertaining to Surveying in the State of Idaho were changed by the last Legislature only in respect to their administration and enforcement. As the law now stands, the Department of Law Enforcement assumes the duties of the old Board of Examining Surveyors. The examination for licensed land surveyors will be held the first Tuesday in September. Robert E. Jones is the Commissioner of Law Enforcement, with office at Boise.

JOHNSON, ARIZ.—Aug. 23

Revival of Operations in this district is expected in the near future and indications are that a large tonnage will be shipped daily. With the exception of two small properties doing development work, this camp has been shut down for the last six months, and the town was almost deserted, the miners going to other places to secure work. On July 20th, the Arizona United Mining Company put a few men to work cleaning up and getting the machinery in shape for operation, and more men have been put on each day. The railroad which connects with the main line of the Southern Pacific at Dragoon, and hauls all ore out and supplies in, is in bad condition, owing to the six months' idleness and recent heavy rains. A force of men are repairing the road bed and putting the track in condition for hauling.

The Arizona-Michigan property has been taken over by the Mines and Development Corporation and mechanics have been overhauling the machinery which this company has installed at the mine. This property will start as soon as the railroad begins operating which will allow shipments of fuel oil to be hauled in. This company is going to build a 50-ton concentrator near the collar of its main shaft. Connections will be made with this shaft from the old incline and all hoisting done in the perpendicular shaft.

BIRMINGHAM, ALA.—Aug. 23

United Mine Workers of America, Alabama District, No. 20, are choosing delegates to represent this district at a convention to be held at Cleveland, Ohio, on Sept. 9. Fifty delegates are expected to go from this district. It is believed that the matter of a 6-hour day, five-day week will be the cause of much discussion.

Production of Iron in Alabama showed a decided increase for July as against June, 142,772 tons of pig iron being produced, a gain of about 14,000 tons over June. Provided there is no unlooked for setback, August is expected to show a corresponding gain over July, as several furnaces are being prepared for operation. Pig iron is expected to advance another dollar a ton soon, and manufacturers in the Birmingham district are paying little attention to further orders for last quarter delivery and no effort whatsoever is being made to sell iron for 1920 delivery. Production was affected somewhat during the second week in August by the strike of railway shopmen, but before the situation became acute the strike was called off.

The shipbuilding industry in Mobile is calling for considerable Birmingham iron and steel, particularly fabricated steel, plates, nuts, bolts, rods, beams and similar materials. The building of concrete ships at Mobile calls for large quantities of steel rods, and the Birmingham district will be required to furnish these. The Chickasaw Shipbuilding Company has three steel boats under way and this company is said to have contracts for eight more large ships from the Federal Shipping Board. This company and others at Mobile depend on the Birmingham district for the greatest part of their steel products.

TORONTO, ONTARIO—Aug. 23

Vocational Training for Returned Soldiers will be given in accordance with the request of many war veterans of northern Ontario, and a class will be established at the Haileybury School of Mining. The course will include milling and assaying, and the veterans will receive full pay and allowances while they are receiving instruction.

The Consolidated Iron & Steel Corporation, Ltd., a new company representing Toronto and Detroit interests, and capitalized at $8,000,000, has opened an office at 20 King St., East, Toronto, and is developing two large iron-ore deposits. One of these is a hematite mine situated at Furnace Falls, Leeds County, about twenty-five miles north of Brockville, comprising 1,500 acres, where several thousand tons of ore are now ready for shipment. The other property is situated at Mileage 182, on the Algonia Central Ry., where diamond drilling has been carried on since November, 1917, proving large deposits of ore to a depth of 500 ft. Engineers estimate the tonnage at high figures. Work on both properties is being actively prosecuted.

In the Development of the Peace River Oil Field of Alberta, a critical stage has been reached, the future of the field appearing to be dependent upon whether the difficulty occasioned by a heavy flow of salt water can be successfully overcome. So far, every well sunk into the Devonian sand formation between 965 and 1,125 ft. in the established field below Peace River crossing has reached the oil-bearing stratum. But directly beneath this lies a stream of salt water subjected to an enormous pressure of wet gas, the upward flow of which has necessitated the abandonment of several promising wells. It is now realized that the success of operations depends upon finding oil below the salt water and overcoming the menace of flooding.

The Peace River Oil Co., promoted by J. D. McArthur, has been working continuously since 1916, in which year well No. 1 was sunk about fifteen miles downstream from Peace River Crossing. It reached a depth of 1,125 ft., at which point the drill was in the recognized oil stratum, when the water suddenly gushed up 30 ft. above the derrick, driven by an enormous pressure of gas and putting an end to operations. The well was abandoned, and in 1917 well No. 2 was begun a short distance upstream from its site. The oil sands were struck at 962 ft. When a depth of 1,032 ft. was reached the oil had risen to a depth of 425 ft. in the well. But at 1,085 ft. the salt water was encountered and a strong flow under heavy gas pressure submerged the derrick and rendered all attempts to resume operations futile. Last year the company began sinking for the third time on a site on the west bank of the river five miles below the town. The operators had to face practically the same conditions as those previously encountered. The salt water difficulty has been satisfactorily overcome, and the drill has reached a depth of 1,200 ft., its objective being the oil deposit believed to occur below the salt-water stream.

The Tar Island Oil & Gas Co. is operating almost opposite well No. 2 of the Peace River Co. on the opposite bank of the river. The company has had to contend with the same hindrance from the flow of salt water, but has succeeded in checking it and is drilling to reach the lower oil stratum. The Three Creeks Oil Co. is operating a property known as the H. L. Williams well, which is down 1,155 ft. Drilling has been suspended for some months by reason of the flow of salt water, which it is hoped to shut off soon.

VICTORIA, B. C.—Aug. 19

The Complex Ore Reduction Co., which was organized a few years ago to operate the French process for the extraction of zinc from complex ores and for its electrolytic precipitation, has closed down. The British Columbia government fathered the process, guaranteeing the company's bonds to the extent of $65,000, and a plant was built near Nelson. The government of course, will lose the money guaranteed.

The Granby company is shipping quartz ore from the Grand Forks smeltery to Anyox. This seems to destroy the last hope that the furnaces at Grand Forks will ever be blown in again, at any rate, so far as the Granby company is concerned. Boyle Brothers, of Anyox, have undertaken a contract for extensive diamond drilling on the Big Missouri, Salmon River district. Development work is said to be showing up a good body of ore. The Standard mine, near Silverton, is developing a new orebody. Carl C. Hand, of Los Angeles, and A. W. McClune, of Salt Lake City, have made an examination of the Queen mine. The tunnel is in 1,200 ft., and it is expected the Queen vein will be cut at 1,500. The Yellowstone vein was cut at 700 ft.

GUANAJUATO, MEXICO—Aug. 14

Returns fro mthe Gubernatorial Election held on July 20 were delayed considerably. Contrary to expectations, election day did not bring the disturbances that had been anticipated, owing to the friction that had manifested itself among the followers of the two principal candidates, Montes and Madrazo. A change in the local government is always watched with great interest by operators; because, with Bolshevism and labor agitation in other countries, a conservative administration is greatly desired. As all mills in the Guanajuato district are treating very low-grade ore, the strictest economy must be practiced, and excessive demands on the part of the laborers would cause a cessation of operations. What this means to the camp was clearly illustrated by the famine and pestilence which followed the closing down of the properties in 1916; which condition has also helped to bring about the present dearth of skilled workmen in the district. There are, at present, approximately from 3,000 to 4,000 men at work in the various mines and mills.

During the last week, the rains have abated somewhat. It is hoped that the men who have refused to work in the mines, owing to their wet condition, and those who have left for ranches, will return and relieve the labor shortage, which has caused curtailment of operations.

THE MINING NEWS

**Progress of Mining Operations
Condensed and Classified
for Easy Reference**

ALASKA

ALASKA SHIPMENTS of domestic copper ore, matte, etc., to the United States in June totalled 3,021,912 lb., valued at $483,580.

ALASKA GOLD (Juneau)—Milled 153,000 tons in July, averaging 97.4c. per ton. Per cent extraction, 81.52. Tailings loss, 18c. per ton. In June milled 159,510 tons, averaging 94c. In July, 1918, milled 74,830 tons, averaging $1,319.

ARIZONA

Maricopa County

DRAGON (Wickenburg)—The Dragon Mining & Development Co. purchased two carloads of mining and milling equipment from Butress & McClellan, of Los Angeles, which is being shipped to the property, twelve miles east of Allah and about sixteen miles southeast of Wickenburg. Equipment includes 25 hp. Western gas engine hoist, a 12 x 14-in. Laidlaw Dunn Gordon compressor, a 60 hp. Commercial gas engine, a No. 2 Cameron sinker pump, and complete equipment for 50-ton concentrating plant.

Pinal County

RAY BOSTON COPPER (Kelvin)—Has been organized to take over the property formerly owned by the Kelvin Sultana Copper Co. New company capitalized at $5,000,000, is in part a reorganization of the old Kelvin Sultana stockholders. A. H. Westfall, of Phoenix, president of the old company, is president of new company. C. E. Hart, of Miami, will be consulting engineer and general manager. E. P. Worthington will be superintendent. Has planned extensive diamod-drilling campaign to further prove property. Is well equipped with modern mining equipment, including steam-driven power plant furnishing electric power. A 250-ton concentrator is on the ground. Considerable amount of development work has been done. Main shaft is 500 ft. deep, with lateral exploration on the 300-, 400-, and 500-ft. levels. Closed down in September, 1916, at the instance of the bondholders. A. L. Flagg was then appointed receiver. Was purchased by the bondholders at foreclosure sale in January of this year. Reorganization being carried out by the Baldwin Syndicate, of which G. P. Baldwin is president.

WHITE METAL (Kelvin)—Most of the recently purchased mining equipment has been moved to the camp. Heavy rains damaged the roads and held up this work. Expected active development work on large scale will be begun by Sept. 1. J. C. Devine is in charge.

BROKEN HILLS (Ray)—L. D. Huntoon, president, is on the property laying out further development work on the original holdings and on some of the recently acquired properties adjoining. Lower tunnel is still being driven to the eastward.

Yavapai County

McMAHON GROUP (Kirkland)—Leased to J. F. Healey, of Prescott, Ariz., who will do some development work.

CALIFORNIA

Calaveras County

MORGAN MINE (Carson Hill)—Clean-up for July said to exceed $100,000. Good results obtained in developing 675-ft. level.

El Dorado County

MOUNT HOPE (Placerville)—Being operated by J. Baring Gould. Contracted for crosscut tunnel. Mine fully equipped with stamp mill, air compressor and hoist.

WHITE ROCK (Placerville)—Large deposits of white quartz being operated by the Drake Company, of San Francisco, under management of G. G. Fraser. Deposit estimated 6,000 ft. long and 20 ft. thick, averaging approximately 99 per cent silica.

Kern County

CALIFORNIA RAND SILVER, INC. (Randsburg)—Shaft is now 24 ft. deep and twenty cars of ore have been shipped. Syndicate of Bakersfield men headed by L. V. Olcease is reported to have purchased a one-eighth interest for $100,000.

Nevada County

GOLDEN CENTER MINE (Grass Valley)—Struck new vein in 500 west crosscut.

KENOSHA (Grass Valley)—New electric pump with capacity of 500 gals. per min. has been installed. Mine now being pumped out and equipment being completed. Expected that operations will soon be resumed. Loyd Root is in charge.

MOUNTAINEER MINES CONSOLIDATED (Nevada City)—Purchased by Peter Bender at auction sale for amount of judgment and costs.

BROWN BEAR GRAVEL MINE (St. Charles Hill)—Gravel found in raise 40 ft. above main tunnel, which is being driven ahead to get under center of channel.

Plumas County

ENGELS COPPER (Engelmine) — By appeal to Railroad Commission power bill has been reduced $40,000 a year.

COLORADO

Boulder County

SMUGGLER (Ballarat)—C. E. Schultze, of St. Louis, recently acquired large interest. Recent developments are promising.

BLUE BIRD MINES (Caribou)—W. S. Jennings, of New York, who recently examined the mines, stated he and his associates have decided to develop. If production warrants they will build complete reduction plant. Property is an old-time high-grade silver mine.

Clear Creek County

GEORGETOWN TUNNEL COMPANY has a large force engaged in excavating for mill-site. Construction will be pushed as rapidly as possible. In addition, a large force is at work in mine on development, and small force engaged in stoping high-grade silver ore from Clara B. lode. As result of high price of silver, a great amount of activity is going on in this region, and numerous old properties are being reopened and examined.

Gunnison County

GUNNISON A-1 OIL CO. (Gunnison)—Composed of local men, has begun drilling first hole on Dollar Ranch on site selected by geologists as being centre of dome on Ohio Creek anticline. Several operators in locality have recently developed small amounts of oil on this anticline. Expected that this well will be drilled to much greater depth than any of the other holes.

Lake County

CRESCENTIA (Leadville)—One of the shafts belonging to the old Emmet Mining Co. has just been reopened by Rogers & Co. Now down 600 ft. and has developed good body zinc ore, from which shipments will be made.

MATCHLESS (Leadville) — New York owners have begun a vigorous development campaign. Operations will be confined to lower ore horizons. Dr. Bailey, of New York, is in charge. Surface plant has already been repaired and placed in operation, and when shaft is repaired sinking will begin.

Park County

THE COLORADO POWER CO. is extending one of its lines to Hilltop mine, a lead producer. Property is inaccessible and fuel scarce, and expected that with electric power will become important producer.

Saguache County

EAGLE MINE (Bonanza)—On Kerber Creek, two miles east of Bonanza, has recently been taken over by C. M. Glasgow and associates, of St. Louis, Mo. Last year D. C. Kelso unwatered the mine, thoroughly sampled it, and conducted experiments on the method of treating the ore. A 50-ton flotation mill is being built, and a power line of the Colorado Power Co. has already been extended from the Shawmut mine, near Bonanza, and unwatering of mine is again about to be undertaken. Shaft is now 500 ft. deep, and fair-sized tonnage of argentite in a rhodocrosite gangue available. Ore averages 10 oz. in silver. Dump of 5,000 tons will also be treated.

Summit County

NORTH LONDON (Alma)—Mill expected to resume operations soon. Considerable activity going on, and believed that no difficulty will be encountered in maintaining sufficiently large ore reserves to keep operating continuously.

IDAHO

Boundary County

IDAHO CONTINENTAL (Port Hill)—Shipped 60 tons concentrates daily since July 23, when road became good enough for hauling. Using 12 motor trucks for the 26-mile haul. According to Robt. N. Bell, state mine inspector of Idaho, the "smelter returns from several thousand tons recently shipped show general average of 60 per cent lead and 22 oz. of silver. With 1,700 tons of finished product in bins, mill treating 250 tons daily making 25 to 30 tons concentrates, a large output of shipping ore is assured if metal market is maintained. Estimates of 80,000 tons above No. 4 level were ultra conservative and reserves now indicate ten times that amount of probable and possible ore."

LOUISIANA

SOUTHWEST LOUISIANA DEVELOPMENT COMPANY has been organized to lease lands in this state and sublease them to drilling companies. Possible oil land 26 000 acres in extent now under lease. Contract closed with Shreveport and Chicago company to drill. Work will begin soon.

LARGE ACREAGE IN ALLEN PARISH leased to Oklahoma company and drilling will begin at once. Land, known as West Bay, covers several thousand acres.

Claiborne County

WILD-CAT WELLS being drilled in Bienville, Claiborne, DeSoto, Red River and Webster parishes. Good well recently brought in on Bull Bayou at 2,500 ft. Gas found in several of North Louisiana parishes, and oil boom is expected.

STANDARD OIL CO. (Homer)—No. 2 Oaks well came in recently flowing 6,000 bbl. a day, it is reported, from depth of 2,100 ft. Oil is 38 Bé., exceptionally high, as Gulf Coast oil is usually about 22. Number of smaller wells in this district making good production from depths of 1,100 to 1,200 ft.

MICHIGAN

Copper District

WOLVERINE (Kearsarge) — Produced in July 331,736 lb. refined copper from 24,038 tons of rock, being 13.8 lb. per ton.

MOHAWK (Mohawk)—Shows extraction of 23 73 lb. refined copper per ton stamped. Largest producer is No. 6 shaft, which is turning out more than 45 per cent of the total. No. 1 produces nothing. No. 5, 20 per cent of total and No. 4, remainder. No. 5 being sunk below 20th level and No. 6 below the 16th.

MINNESOTA

Cuyuna Range

DRILLING being done on Section 30-136-26, north of the Mississippi River and three miles north of Manganese.

MINE RESCUE STATION to be established at Crosby, is proposed by B. O. Pickard, district representative of the Bureau of Mines. Plans have been prepared. Building and equipment estimated to cost $20,000. Four men would be maintained, and present plans call for the expense of building, equipping and maintenance to be assumed by mine operators.

BIWANAGO (Crosby)—Drilling NE-NW Section 12-46-29, in platted portion of Crosby immediately south of the Croft mine.

IDA MAE (Crosby)—Sinking shaft 30 ft. deeper. Will put in underground pocket and change main haulage drifts to permit of large output. Let contract to McCoy, of Trommald, for digging ditch to drain chain of lakes, some of which lie over orebody.

NORTH RANGE IRON (Trommald)—Property on Section 4-46-29, on which shaft was sunk and underground development done last year, being again drilled by Abdar Development Co.

Mesabi Range

BOURNE (Hibbing)—New property of Cleveland-Cliffs Iron Co. grading for shaft. Not yet announced whether property will be open pit or underground. If open pit, shaft will be for drainage purposes only. When developed will complete the circle of mines surrounding the present site of the village of Hibbing.

PHILBIN (Hibbing)—Oliver Co. completed shipment of 70,000-ton stockpile.

SARGENT (Keewatin)—Big new open pit of Wisconsin Steel Co. had just prepared to enter shipping list when shut off by embargo on ore shipments. Will probably ship heavily with lifting of embargo. Established record for development, having been stump-covered wilderness one year ago.

VEGA (Mesaba)—Report sale of 30,000 tons manganiferous ore guaranteed 10 per cent manganese. Vega Mining Co. operators. Formerly known as Mayas and operated by Coates & Tweed.

FRANKLIN (Virginia)—Property, opened by Franklin Rockefeller and associates in 1893, has made final shipment. Total shipments, 2,233,000 tons.

MONTANA

Beaverhead County

BOSTON & MONTANA DEVELOPMENT (Wise River)—Drift on 900-ft. level on Idanha vein continues in ore maintaining width of 10 ft. of good milling grade. Rails of Montana Southern Ry., designed as outlet for ores, now laid to within ten miles of Elkhorn mines.

Missoula County

POTOMAC COPPER (Potomac)—No. 2 tunnel in 500 ft., with country rock well seamed. Copper cliff, one objective of this working, ahead approximately 1,000 ft. No. 2 tunnel also will cut Leonard group of claims at depth of 1,500 ft. Preliminary development here disclosed ore zone 30 ft. wide of milling grade and with streaks up to a foot in width.

Powell County

CHAMPION (Deer Lodge)—Crosscutting for fissure under way, with breast in softer ground. Now believed to be near vein.

Silver Bow County

ANACONDA (Butte)—Labor situation gives evidence of clearing, with period of stability to follow. Metal craf.s strike slowly disintegrating; other organizations declining to walk out. Development work being pushed. Scarcity of miners prevents return to normal capacity for some months. Cold weather expected to cause return of miners from the fields and forests.

BARNES-KING (Butte)—Quarterly report of operating results for period ending June 30 shows earnings for North Moccasin of $223, Shannon $50.402, and Kendall $1,530. Loss on the Peigan-Gloster operations, $20,637. Net profit for quarter, $27,-371.26.

DAVIS-DALY COPPER (Butte)—High-grade ore zone northwest on the 2,100, corresponding with that on the 2,300 and other levels below, appears to be coming in. Rock is showing marked improvement, and there is believed to be little doubt that lower zone will be found to extend upward. Significance of improvement indicates now, it is thought, location of the orebodies nearer the surface in the Davis-Daly.

NORTH BUTTE (Butte) — Produced 1,005,810 lb. copper in July; June, 767,-468; July, 1918, 1,835,551.

NEW JERSEY

Middlesex County

UNITED STATES METALS REFINING (Chrome)—Plant has shut down, owing to labor troubles.

OREGON

Baker County

HUMBOLDT (Greenhorn)—A. R. Sweet and associates purchased this gold property under forclosure and will work it if they do not sell it. Mine equipped with three-stamp mill, crushers and concentrating tables.

TEXAS

REPORTS OF OIL COMPANIES to Texas Railroad Commission must show all business, including capitalization, amount of stock sold, price obtained, commission paid for selling and promotion costs; also production, situation of wells, amount of oil sold, price obtained and the purchaser.

PROHIBITING OF STORAGE in earth tanks of North Texas light crude oil, because of loss by evaporation and seepage, will probably be first conservation step taken by Texas Railroad Commission under authority granted it by Oil & Gas Conservation Act.

Brazoria County

HUMBLE OIL & REFINING (West Columbia)—No. 4 Giraud well brought in recently at 3,200 ft. Making large production by flowing in heads. Liquid about 60 per cent oil and 40 per cent water.

TEXAS CO. (West Columbia)—No. 18 Hogg well brought in, flowing from 3,000 ft., has sanded. Now being washed in attempt to recover.

Dallas County

SALE OF ASSOCIATED PETROLEUM COMPANY'S holdings to Keystone Ranger Development Co., of Pittsburgh, Pa., for sum of $3,000,000, reported here; cash payment of $750,000 made. Associated Petroleum Co. was local organization holding leases on 284,702 acres, and had twenty-nine producing wells.

REPUBLIC OIL & REFINING CO. (Dallas) — Announced construction of 5,000-bbl. oil refinery will commence Sept. 1. Has purchased tract west of city, capitalized for $2,000,000; has two producing wells, and is drilling others. J. A. Jones, Jr., manager.

Hardin County

RIO BRAVO OIL CO. (Saratoga)—No. 34 Jordit well brought in at 1,300 ft., now making fair production by pumping.

SUN CO. (Saratoga)—No. 133 McShane well being tested.

TEXAS CO. (Sour Lake)—Arranging to pump 250 Fee well. At Saratoga, No. 4 Ogden well is 2,900 ft. deep.

Harris County

NEW SURVEYS AT GOOSE CREEK of lands formerly leased from state, but forfeited on acount of non-compliance with terms, will be made at once. Surveys will materially change size and shape of tracts, an effort being made to make all submerged tracts accessible from the shore line. As soon as the surveys are completed, the Goose Creek tracts will be open for bids.

SEVERAL ABANDONMENTS OF WELLS made recently. Taylor Lake Oil Co., abandoned No. 2 Curry; Gambler Oil Co., No. 1 Mowry; Crosby Petroleum Co., No. 1 Fleming; Clear Creek Oil Co., No. 1 Tarson, temporarily.

CUCH REFINING CO. (Houston)—Purchased 500 acres on Houston ship channel at Deepwater, and will build refinery and tanks of large storage capacity. First unit to be 10,000 bbl. capacity. Reported that chief source of crude oil supply will be Central and South America, where contracts already made.

Liberty County

TEXAS GULF (Hull)—Morris Phillips well flowing by heads from 2,500 ft.

SUN (Hull)—No. 1 Joseph Carr well flowing by heads from 1,800 ft.

Orange County

BIG SIX OIL (Orange)—Will drill test well 8 miles west of town on Chesson farm. Rig on ground. Company locally financed.

Sterling County

TEXAS ELKHORN OIL CO., drilling on Richardson ranch, has well 3,950 ft. deep. Has penetrated 85 ft. of Gray Marble Falls sand containing oil throughout. Casing set and cemented at 3,746 ft. Leases in district still being acquired, although little land within three miles is open for lease or purchase.

UTAH

Juab County

TINTIC SHIPMENTS, week ended Aug. 16, amounted to 127 cars.

CHIEF CONSOLIDATED (Eureka) — Produced about 2,500,000 oz. silver in 1918.

NORTH BECK (Eureka)—Amendment of articles of incorporation permitting increase in capitalization to $1,000,000. Property in northwestern part of Tintic, adjoining Centennial-Eureka, Gemini and Ridge and Valley. E. J. Raddatz and associates interested.

YANKEE (Eureka)—Shaft down, 1,100 ft.; making 2½ ft. daily. To be continued to 1,800 ft.

Salt Lake County

EMMA SILVER MINES (Alta)—Statement by trustees covering finances up to Aug. 12, 1919, issued. Shows receipts from assessments of $176,613; from underwriting, $74,609; subscriptions and underwriting stock, $47,903; claims into stock for credit or stockholders, $28,825; a total of $327,952. Disbursements—including cash plus securities of $100,000 held as trustee for Emma Silver Mines Co.—were of like amount. Probable that operations will be resumed soon and that water in workings below Bay City tunnel will be pumped out.

MICHIGAN-UTAH (Alta) — Shipping up to a car of ore daily. About fifty men employed.

MONTANA-BINGHAM (Bingham) — Smeltery settlements on eight cars of ore recently shipped brought $16,448, or about $2,000 per car net. The ore is a pyritic copper one carrying small amounts of gold and silver. C. T. Ballantyne is president and general manager.

Summit County

SILVER KING CONSOLIDATED (Park City)—Reported silver-lead ore opened in raise in Electric Light claim. Raise starts from 1,625 ft. level up about 200 ft. Property has shipped no ore since August, 1918, and has made no regular shipments since May, 1918. During last year long drain tunnel in process of being driven in 10,000 ft.

WASHINGTON

Okanogan County

TIP TOP (Nespelem)—F. C. Hammond has taken a bond and reports ore at bottom of 100-ft. shaft, carrying silver, lead and gold. Vein said to extend 1,000 ft. on surface.

Stevens County

CONSOLIDATED COPPER (in Cedar Canyon district)—Shipped 208 tons, silver, copper and gold ore this year.

REARDON COPPER MINES (in Cedar Canyon district)—Shipped 137 tons this year.

AICHEN BEE (in Deer Trail district)—Has driven tunnel 108 ft. at cost of $16.44 per ft. during this year. Said to have gone through 33 ft. of ore averaging 44 oz. silver and 32 per cent lead.

QUEEN AND SEAL (in Deer Trail district)—Reported sold to New York interests for $60,000 by Charles Turner and associates of Davenport, Wash.

CANADA

Alberta

THE IMPERIAL OIL CO.'s geologist, Charles E. Taylor, announces that as the result of a geological survey by twelve crews in the foothills area, the company will soon start drilling southwest of Lethbridge. The drilling campaign includes a series of test holes in the first anticline east of the mountains all the way from the international boundary to the Mackenzie River basin.

British Columbia

LUCKY JIM (Slocan)—Senator Lendrum McMeans, of Winnipeg, contemplates foreclosing second mortgage, but will protect interests of stockholders if possible.

SILVER BELL (Slocan)—Second car, 26 tons, shipped and returned 237.4 oz. silver to ton, lead 31.1 per cent, zinc 7.1 per cent.

Ontario

CROWN RESERVE (Cobalt) — Purchased two claims in Larder Lake situated to the northeast of the Harris Maxwell.

MOND NICKEL (Coniston)—Cable advices received from the head office in England to ship bessemer nickel-copper matte at the rate of 3,000 tons per month. A large quantity has been stored at Coniston during the war, on account of lack of shipping facilities.

AYOUB CLAIM (Kirkland Lake)—Vein 6 to 8 ft. in width showing visible gold has been opened up.

ASSOCIATED GOLD FIELDS (Larder Lake)—Crosscutting at 100-ft. level of Dr. Reddick property struck what is believed to be the Kerr-Addison deposit of low-grade ore 300 ft. wide. This orebody is 1,200 ft. long, on the Kerr-Addison, and the new strike, if supposition is correct, will lengthen it to 2,000 ft.

CLIFTON (Porcupine)—Drift on first level now 100 ft. in; ore showing visible gold in places.

MEXICO

BRITISH INTERESTS, according to official figures of the Mexican government, have acquired 2,431,000 acres of oil lands in Mexico. The Doheny group is second, with 586,692 acres. Total acreage owned or leased by foreign corporations is 5,436,-271. During May, 6,897,962 bbl. of oil was shipped out of Mexico, the largest quantity for any month of the current year.

INDIA

Upper Burma

BURMA CORPORATION, LTD. (Bawdwin)—Cable advices received in London report ore found in raise above No. 5 level shows 31 oz. silver, 39 per cent lead, 23 per cent zinc and 4 per cent copper. Width, 66 in.

THE MARKET REPORT

Daily and Weekly Metal and Mineral Prices,
Metal Market Conditions, Average
Monthly Prices, Stock Quotations

Silver and Sterling Exchange

Aug.	Sterling Exchange	Silver New York, Cents	Silver London, Pence	Aug.	Sterling Exchange	Silver New York, Cents	Silver London, Pence
21	417	111¾	60¼	25	419	113¼	60¾
22	418	112¼	60⅜	26	419½	114	61¼
23	420½	113¼	60½	27	420½	115¼	61¾

New York quotations are as reported by Handy & Harman and are in cents per troy ounce of bar silver, 999 fine. London quotations are in pence per troy ounce of sterling silver, 925 fine.

Daily Prices of Metals in New York

Aug.	Copper Electrolytic	Tin Spot	Lead N. Y.	Lead St. L.	Zinc St. L.
21	23⅜	54@54½	5⅞@6	5.60@5.70	7.55@7.60
22	23⅜@22⅞	54@54½	5⅞@6	5.60@5.70	7.50@7.55
23	22¾@22½	54@54½	5⅞@6	5.60@5.70	7.50@7.55
25	22¼@22½	54@54½	5⅞@6	5.60@5.70	7.45@7.50
26	22 @22¼	54@54½	5⅞@6	5.60@5.70	7.45@7.50
27	22 @22¼	54@54½	5⅞@6	5.60@5.70	7.40@7.45

The above quotations are our appraisal of the average of the major markets based generally on sales as made and reported by producers and agencies, and represent to the best of our judgment the prevailing values of the metals for the deliveries constituting the major markets, reduced to basis of New York, cash, except where St. Louis is the normal basing point.

Quotations for copper are for ordinary forms of wire bars, ingot bars and cakes. For ingots an extra of 0.05c. per lb. is charged and there are other extras for other special shapes. Cathodes are sold at a discount of 0.125c. per lb.

Quotations for zinc are for ordinary Prime Western brands. We quote New York price at 35c. per 100 lb. above St. Louis. Tin is quoted on the basis of American tin, 99 per cent grade.

London

Aug.	Copper Standard Spot	Copper Standard 3 M.	Copper Electrolytic	Tin Spot	Tin 3M.	Lead Spot	Lead 3 M.	Zinc Spot	Zinc 3 M
21	101	102	110	273	269	24⅞	25½	40	41
22	99½	100½	110	273½	269¾	24¾	25⅜	40	41
23	...	...	...	...	...	...	...	...	...
25	98	99	110	272½	268½	24⅞	25⅜	39¼	40¼
26	96	97	...	271	268½	24⅞	25½	38½	39½
27	98½	99½	...	271½	257½	24¾	25⅜	38½	39½

The above table gives the closing quotations on the London Metal Exchange. All prices are in pounds sterling per ton of 2,240 lb.

Metal Markets

New York—Aug. 27, 1919

The metal markets this week were dull, save for a few large and interesting transactions, and exhibited a good deal of irregularity. Copper was distinctly weaker, owing to the reappearance of resale lots.

Transatlantic freight rates are unchanged at $18, and transpacific at $14.

Copper

In our last report we said that "it seemed not unlikely that the principal producers might realize their prices presently." At that time business was pending, which was consummated on the following day. A brass manufacturer placed a very large order, which was divided among three producers, whose price was paid. Presumably this buyer had contracts to cover and could not obtain so large a quantity of copper from any other hands. Following this transaction, however, producers did no other business worth mentioning, and copper immediately began to be offered down by some of the smaller agencies and by second-hands. On Aug. 22 a round lot was sold at 22¾c. As the week wore on, offerings through brokers, in lots of considerable size, increased, and it appeared that the liquidation of copper held by speculators and others, which was supposed to have been absorbed, had by no means been completed. Toward the end of the week one very large lot was offered, and at the close copper was freely offered at 22c., with the probability that it could be bought for considerably less. Even at such a concession buyers showed no interest.

Other important features of the week were the offering of copper in round lots by Japanese houses. It is known now without any doubt that some of the copper bought by the Japanese a few months ago was taken speculatively. None of that ordered from the Export Association has come back, but there was a good deal of Japanese buying outside of the Association. British houses this week offered ingot bars for import from Great Britain.

The Director of Sales announces that the War Department is preparing to offer for sale under sealed bids its surplus of brass, totaling approximately 192,347,057 lb. The material embraced in the proposed offering includes anvil brass, brass rods, brass bars, brass billets, cast bars, component parts of ammunition, disks, "gilding brass," leaded brass, primer metal, sheets and coils, spring brass, tubing, and scrap. The material to be offered is divided into two general classes, namely, that known to the trade as "70-30," which was used in the manufacture of small arms and field artillery cases, and that known as "60-40," which was used in the manufacture of fuses for sharpnel and high-explosive shells.

Copper Sheets—The base price of copper sheets is 33½c. per lb. Demand strong. Copper wire is quoted at 26@26½c. in carload lots, f.o.b. mill. Market is quiet.

Tin

A fair business was done at not much change in prices. Tin of 99 per cent grade was steady at 54@54½c. throughout the week. Straits was quoted at 56c. up to Aug. 26, when it declined to 55½c., rallying to 55¾@56c. today. Straits for shipment was quoted at 52¼@52½c. Singapore quoted £279, c.i.f. London, on Aug. 22; £276 on Aug. 25; and £275½ on Aug 27.

Lead

Some producers reported a good deal of inquiry, including some from abroad, especially from China and South American countries. Other producers had very little inquiry. However, all of the principal producers were quite indifferent, owing to the full extent to which they are already booked. Consumers bought some round lots from independent producers in the early part of the week, paying 6c., New York, and that price was realized on smaller business right through the week. At the same time second-hands were making offers of lead in lots of 100 to 300 tons at around 5¾c. right through the week, and considerable business was done on that basis. The only explanation of this difference is that some consumers refuse to accept contracts with some of the concerns that are offering

lead cheaply. Just as speculators often have to pay a premium on purchases, at other times they have to accept a discount on sales. Larger interests that might clean up the market may be disinclined to do so, owing to the size of the accumulations that they have already.

Zinc

The market was dull and easier, declining a little from day to day. High-grade zinc quoted at about 8¼c., with only small business done.

Zinc dust is at 10c. for ordinary prolong dust, 10½c. for atomized.

Zinc Sheets—The quoted price of zinc sheets is $10 per 100 pounds.

Other Metals

Aluminum—Virgin metal quoted at 33c. per lb. No change. Market quiet.

Antimony—The market was again dull and declining. We quote spot at 8⅝@8¾c. Some of the Chinese houses have refused to meet these prices, saying that they are not justified by the economic conditions of the industry.

Bismuth—Unchanged at $2.95.

Cadmium—Quoted at $1.40.

Nickel—Ingot, 41c.; shot, 43c.; electrolytic, 45c. per pound.

Quicksilver—Opening the week at $109, sales were made at declining prices, $103 being quoted on Aug. 25. On Aug. 26 a sharp cut to $95 was made. Light demand and freer arrivals and the throwing of a large quantity on the market are given as the explanations. San Francisco telegraphed $102, firm.

Silver and Platinum

Silver market has continued firm, with steadily advancing quotations from London, which closed at 61¾d., a figure that had not been touched since July, 1866. With firmer market for sterling exchange, New York quotations have kept pace with London, and close at 115½c. China demand has fallen off, as Chinese exchanges have not risen in proportion to the London market. Market closes steady.

Mexican dollars at New York: Aug. 21, 85⅞; Aug. 22, 86¼; Aug. 23, 86⅝; Aug. 25, 86⅞; Aug. 26, 87½; Aug. 27, 88⅝.

Platinum—The advance to $110 last week was maintained, the metal being in strong demand.

Palladium—Unchanged at $120.

Zinc and Lead Ore Markets

Joplin, Mo., Aug. 23—Zinc blende, per ton, high, $51.30; basis 60 per cent zinc, premium, $48.50; Prime Western, $47.50; fines and slimes, $45@$42.50; calamine, basis 40 per cent zinc, $30. Average settling prices: Blende, $47.65; calamine, $30; all zinc ores, $46.79.

Lead, high, $65.25; basis, 80 per cent lead, $62.50; average settling price, all grades of lead, $63 per ton.

Shipments the week: Blende, 5,685; calamine, 299; lead, 1,274 tons. Value all ores the week, $360,120.

Shipping is in a most deplorable condition. One smelterman reports 2,400 tons between the purchase and delivery. At the Ottawa station of the Frisco railway there are reported between 260 and 300 carloads of ore that the railroads are not attempting to move. Today it is reported the switches down near the mines, at Tar River and other points, are filling with loaded cars of ore. It is roughly estimated that there are over 400 cars of ore loaded and on sidetracks in Ottawa County alone.

Platteville, Wis., Aug. 23—Blende, basis 60 per cent zinc, $48.50 base for premium grade and $46 to $47 base for high lead or Prime Western grade. Lead ore, basis 80 per cent lead, $62.50 per ton. Shipments reported for the week are 2,242 tons blende, 127 tons galena, and 444 tons sulphur ore. For the year to date the totals are 64,791 tons blende, 3,812 tons galena, and 10,115 tons sulphur ore. During the week 2,852 tons blende was shipped to separating plants.

Other Ores

Chrome Ore — Quoted nominally at $25, f.o.b. California points, but that price can be shaded sharply.

Manganese Ore — Unchanged. Consumers seem to be well supplied.

Molybdenum Ore — Dull and unchanged.

Tungsten Ore—Business has naturally come to a standstill pending consummation of tariff legislation. The House of Representatives has passed a bill putting a large duty on the importation of tungsten ore.

Other Minerals

Nitrate—Conditions reported dull. Spot supplies are quoted at $2.90 to $2.95 per cwt., carload lots. According to an estimate received from one trade source, Government stocks remaining unliquidated amount to as little as 5,000 tons.

Pyrites—Spanish pyrites is quoted at 17½c. per unit for furnace size ore, free from fines, c.i.f., New York or other Atlantic port. Market slow and unsettled; hand-to-mouth buying. Very little ore coming in. Price will decrease with ocean freights.

Sulphur—No change has occurred in the general situation during the week. Prices are still quoted $18 per ton, carload lots, domestic delivery, and $20 per ton, cargo lots, for export shipments. Both quotations are at mines, Freeport, Tex., and Sulphur Mines, La.

Iron Trade Review

New York, Aug. 27, 1919

Nothing in the events of the week has changed the judgment of the steel trade that the strength of the strike movement engineered by the American Federation of Labor has been greatly overstated, according to *The Iron Age*. The number of men voting has been carefully suppressed. The President's stand against a sweeping railroad wage advance has not helped the steel strike drive. If steel works mechanics strike, they may shut down some departments, but the large majority of mill workers are opposed to being thrown idle.

A significant development was the action of representatives of Midvale Steel & Ordnance Co. employees, gathered in their quarterly meeting, in declaring against a shorter day's work and an increased wage, and calling for "increased production and the stabilization of prices in conformity with wages now being paid."

Neither manufacturers nor consumers of steel appear to be taking any of the safeguarding steps as to stocks or shipments of material that are commonly seen when a strike is considered imminent.

At one Eastern and one Western steel plant eight-hour turns have just been granted, but at the former the output went down because enough men could not be found for three shifts.

Export trade, made up of so many kinds of material in moderate and small tonnages that its magnitude is scarcely appreciated, is still expanding.

Pittsburgh—Aug. 26

Up to the time of the President's general statement to the public, given in Washington dispatches published this morning, there was no small possibility of a strike being called in the steel industry by the representatives of the American Federation of Labor who have been attempting to organize the industry, and there were also possibilities of plants being closed in anticipation of labor troubles. The so-called "strike vote" ordered July 20 by the representatives of twenty-four unions affiliated with the Federation, and having more or less membership in the iron and steel industry, was announced on the evening of Aug. 20 as having been 98 per cent affirmative, and a special committee of six of the general organizing committee was instructed to approach the iron and steel manufacturers, seeking a conference Failing to make arrangements within ten days, or by Saturday, Aug. 30, the committee had authority to call a strike. Though the attitute of the steel producers as to engaging in a conference has not been made known, it has been absolutely certain that unionization of the mills and furnaces would be resisted, the issue presented being that of recognizing the union and establishing principles such as the check-off.

The President's public statement calling plainly upon everyone to declare a truce in labor matters until conditions are settled, and stating that wage advances would make futile the present efforts to reduce the cost of living, is generally received in the steel trade today as laying down a clear course of conduct, and it is believed that in the circumstances the Federation committee of six, under the chairmanship of Samuel Gompers, will not make any radical demands.

The entire iron and steel market situation has been under the domination of labor conditions and prospects. Though some buyers have been less disposed to place orders, others have

been more insistent, fearing a curtailment in production later. Mills and furnaces, on their part, have been indisposed to sell, and a number of mills have been practically out of the market. These mills are comfortably sold, but if they were certain of being able to produce full tonnages they would feel safe in making additional sales for deliveries over the next few months. As to inquiries and offerings, the market is entirely in sellers' favor, but, unlike the condition at other times, when it was a sellers' market, the producers show no disposition to advance their prices, recognizing that it would be impolitic to do so. A few producers of finished-steel products are exceptions, in that they do not realize this principle and accordingly have advanced prices.

Production of steel is running at between 75 and 80 per cent of capacity. The percentage of capacity in operation is considerably larger than this, but, on account of weather conditions and inefficiency of many of the men employed, the tonnage per unit of plant equipment is not what it should be. The Cleveland works of the American Steel & Wire Co. and the Gary and South works of the Illinois Steel Co. are now in full operation, having recovered from the difficulties started a few weeks ago by strikes of railroad shopmen.

Pig Iron—The local pig-iron market is firm but distinctly inactive. No price concessions are found, and there is scarcely any disposition to ask prices above the regular schedule. We quote: Bessemer, $27.95; basic, $25.75; malleable, $26.25 to $27.25, depending on analysis; foundry, $26.75; forge, $25.75, f.o.b. Valley furnaces, with $1.40 freight to Pittsburgh.

Steel—The scarcity of sheet bars continues, but no production of sheets or tin plates is being lost. Rolling billets are quiet, and there is a moderate run of forging billet business in the usual small lots. We quote: Billets, $38.50; sheet bars and small billets, $42; slabs, $41; forging billets, $51; rods, $52.

Ferromanganese—There is greater rivalry between domestic and English producers, with consumers preferring to favor the English when they desire to buy, which is not often. Regular quotations, which are more or less nominal and subject to competition, are $105, c.i.f., for English, and $110, delivered, for domestic, 80 per cent.

Coke—The market has been quiet in furnace coke since the advance in asking prices to $4.75 and higher, and the tone of the market now seems to be a shade easier, though asking prices have not been reduced. Foundry coke is firm at $5.50 to $6.25, depending on brand. Connellsville coal for byproduct coking recently brought $3, but $2.85 is about as much as can be obtained now. It is more profitable for the operator to sell coal than coke, but the difficulty is in securing coal cars, all operators having regular ratings for coke-cars.

MONTHLY AVERAGE PRICES OF METALS

Silver

	New York			London		
	1917	1918	1919	1917	1918	1919
Jan.	75.630	88.702	101.125	36.682	44.356	48.438
Feb.	77.585	85.716	101.125	37.742	42.792	48.027
Mar.	73.861	88.082	101.125	36.410	43.620	48.171
April	73.875	95.346	101.125	36.963	47.215	48.886
May	74.745	99.505	107.135	37.940	48.980	52.104
June	76.971	99.500	110.430	39.065	48.875	53.896
July	79.010	99.625	106.394	40.110	48.813	54.133
Aug.	85.407	100.292	.....	43.418	49.077	.....
Sept.	100.740	101.125	.....	50.920	49.500	.....
Oct.	87.332	101.125	.....	44.324	49.500	.....
Nov.	85.891	101.125	.....	43.584	48.969	.....
Dec.	85.960	101.125	.....	43.052	48.492	.....
Year.	81.417	96.772	.....	40.851	47.516	.....

New York quotations cents per ounce troy, 999 fine London, pence per ounce, sterling silver, 925 fine.

Copper

	New York		London			
	Electrolytic		Standard		Electrolytic	
	1918	1919	1918	1919	1918	1919
Jan.	23.500	(a)	110.000	92.238	125.000	106.619
Feb.	23.500	16.763	110.000	78.700	125.000	95.700
Mar.	23.500	14.856	110.000	76.821	125.000	82.071
April	23.500	15.246	110.000	77.300	125.000	82.200
May	23.500	15.864	110.000	77.767	125.000	81.227
June	23.500	17.610	110.000	83.062	125.000	85.900
July	25.904	21.604	119.913	99.576	134.913	103.046
Aug.	26.000	.....	122.000	.....	137.000	.....
Sept.	26.000	.....	122.000	.....	137.000	.....
Oct.	26.000	.....	122.000	.....	137.000	.....
Nov.	26.000	.....	122.000	.....	137.000	.....
Dec.	(a)	.....	118.447	.....	133.167	.....
Year.	24.628	.....	115.530	.....	130.507	.....

(a) No market.

Tin

	New York		London	
	1918	1919	1918	1919
January	85.500	67.702	293.227	248.557
February	92.000	66.801	311.525	223.963
March	(a)	67.934	318.875	236.843
April	(a)	72.500	329.905	225.275
May	(a)	72.500	364.217	234.398
June	(a)	71.240	331.925	238.263
July	(a)	68.000	360.347	253.272
August	(a)	.....	380.900	.....
September	(a)	.....	343.905	.....
October	(a)	.....	335.543	.....
November	(a)	.....	323.550	.....
December	(a)	.....	267.736	.....
Av. year	(a)	.....	330.138	.....

(a) No average computed.

Lead

	New York		St. Louis		London	
	1918	1919	1918	1919	1918	1919
January	6.782	5.432	6.684	5.316	29.00	37.227
February	6.973	5.057	6.899	4.784	29.00	28.675
March	7.201	5.226	7.091	4.992	29.00	27.952
April	6.772	4.982	6.701	4.722	29.00	24.888
May	6.818	5.018	6.704	4.773	29.00	23.852
June	7.611	5.340	7.511	5.070	29.00	22.544
July	8.033	5.626	7.750	5.408	29.00	23.457
August	8.050	.....	7.750	.....	29.00	.....
September	8.050	.....	7.750	.....	29.00	.....
October	8.050	.....	7.750	.....	29.00	.....
November	8.050	.....	7.750	.....	31.20	.....
December	6.564	.....	6.324	.....	40.00	.....
Year	7.413	.....	7.222	.....	30.10	.....

Zinc

	New York		St. Louis		London	
	1918	1919	1918	1919	1918	1919
January	7.836	7.272	7.661	7.922	54.000	56.045
February	7.814	6.623	7.639	6.273	54.000	46.150
March	7.461	6.500	7.286	6.150	54.000	38.500
April	6.890	6.465	6.715	6.114	54.000	36.118
May	7.314	6.429	7.114	6.079	54.000	35.477
June	8.021	6.901	7.791	6.551	54.000	36.763
July	8.688	7.873	8.338	7.523	54.000	41.815
August	8.985	.....	8.635	.....	54.000	.....
September	9.442	.....	9.092	.....	54.000	.....
October	8.801	.....	8.451	.....	54.000	.....
November	8.481	.....	8.141	.....	54.100	.....
December	8.163	.....	7.813	.....	56.050	.....
Year	8.159	.....	7.890	.....	54.180	.....

New York and St. Louis quotations, cents per pound. London, pounds sterling per long ton.

Pig Iron, Pittsburgh

	Bessemer‡		Basic‡		No. 2 Foundry	
	1918	1919	1918	1919	1918	1919
January	$37.25	$33.60	$33.95	$31.40	$33.95	$32.40
February	37.25	33.60	33.95	31.40	33.95	32.40
March	37.25	32.54	33.95	31.40	33.95	29.12
April	36.15	29.35	32.95	27.15	33.95	28.15
May	36.20	29.35	33.00	27.15	34.00	28.15
June	36.36	29.35	33.16	27.15	34.16	28.15
July	36.60	29.35	33.40	27.15	34.40	28.15
August	36.60	.....	33.40	.....	34.40	.....
September	36.60	.....	33.40	.....	34.40	.....
October	36.60	.....	34.40	.....	35.40	.....
November	36.60	.....	34.40	.....	35.40	.....
December	36.60	.....	34.40	.....	35.40	.....
Year	$36.67	.....	$33.70	.....	$34.45	.....

‡ As reported by W. P. Snyder & Co.

STOCK QUOTATIONS

N. Y. Exch.†	Aug. 26
Alaska Gold M	2⅜
Alaska Juneau	2
Am.Sm.&Ref.,com	76⅞
Am.Sm. & Ref.,pf	103
Am.Sm.Sec., pf., A	89
Am. Zinc	25
Am. Zinc, pf	59½
Anaconda	68
Batopilas Min	1½
Bethlehem Steel	85½
Butte & Superior	28
Butte Cop. & Zinc	12⅜
Cerro de Pasco	54
Chile Cop	24
Chino	44
Colo. Fuel & Iron	44
Crucible Steel	149
Crucible Steel, pf	100½
Dome Mines	13
Federal M. & S.	13½
Federal M. & S., pf	32
Great Nor., ore ctf	42⅞
Greene Cananea	42⅞
Gulf States Steel	58
Homestake	70
Inspiration Con	60⅛
International Nickel	26⅛
Kennecott	37
Lackawanna Steel	78⅜
Mexican Petrol	175
Miami Copper	27⅛
Nat'l Lead, com	79
National Lead, pf	106⅛
Nev. Consol	18⅜
Ontario Min	7
Ray Con	24⅛
Republic I.&S.,com	90⅜
Republic I.&S., pf	104⅛
St. Joseph Lead	14⅜
Sloss-Sheffield	64
Tennessee C. & C	73⅛
U. S. Steel, com	102⅜
U. S. Steel, pf	115⅜
Utah Copper	84
Va. Iron C. & C	59
Worthington Pump	69

Boston Curb *	Aug. 26
Boston Ely	1⅛
Boston & Mont	.74
Butte & Lon'n Dev	.18
Calaveras	1⅛
Chief Con	3⅛
Contact	.30
Cortez	.12
Crown Reserve	.25
Crystal Cop	.12
Crystal Cop. (new)	.64
Eagle & Blue Bell	2⅜
First Nat. Cop	1⅛
Gadsen Cop	4⅛
Houghton Copper	1
Intermountain	‡ .05
Iron Blossom	.25
Iron Cap	12⅛
Majestic	.27
Mexican Metals	.05
Mojave Tungsten	.12
Nat. Zinc & Lead	.08
Nevada-Douglas	.20
New Baltic	3⅛
Oneco	.75
Rex Cons	‡ .16
United Verde Ex	.44
Yukon Gold	1⅛

San Fran.*	Aug. 26
Andes	.20
Best & Belcher	.08
Caledonia	.20
Challenge Con	.15
Confidence	‡ .25
Con. Virginia	1.75
Gould & Curry	.06
Hale & Norcross	‡ .19
Jacket-Cr. Pt	.11
Mexican	.12
Occidental	‡ .40
Ophir	1.40
Overman	.08
Savage	.15
Sierra Nevada	.12
Union Con	.16
Utah Con	‡ .03
Belmont	3.00
Jim Butler	.30
MacNamara	.57
Midway	.17
Mont.-Tonopah	.11
North Star	.06
Rescue Eula	.16
West End. Con	1.30
Atlanta	.03
Booth	.06
Comb. Frac	.04
Florence	.42
Jumbo Extension	.10
Kewanas	.04
Nevada Hills	.03
Nevada Packard	.30
Round Mountain	¾
Silver Pick	.06
Simon	1.77½
White Caps	.16

Colo. Springs *	Aug. 26
Cresson Con	2.75
Doctor Jack Pot	.03
Elkton Con	.03¼
El Paso	.19
Gold Sovereign	‡ .02
Golden Cycle	1.58
Granite	.10
Isabella	.04½
Mary McKinney	‡ .06½
Portland	.95
United Gold M	.16½
Vindicator	.39½

Boston Exch.†	Aug. 26
Adventure	‡1½
Ahmeek	82
Algomah	‡1
Allouez	44
Ariz. Com	15
Arnold	‡ 50
Bingham Mines	‡8½
Bonanza	‡.20
Butte-Balaklava	‡ 65
Calumet & Ariz	77½
Calumet & Hecla	425
Carson Hill	24½
Centennial	16
Copper Range	53⅛
Daly West	‡3
Davis-Daly	9½
East Butte	18½
Franklin	4
Granby	‡73½
Hancock	7
Hedley	‡12
Helvetia	5½
Indiana	1
Isle Royale	34½
Keweenaw	‡1
Lake	5
La Salle	‡4
Mason Valley	3
Mass	7
Mayflower	9¼
Michigan	9
Mohawk	73
New Arcadian	4½
New Cornelia	25
New Idria	‡11
Nipissing	10
North Butte	16½
North Lake	‡1
Ojibway	‡3
Old Dominion	42
Osceola	62
Quincy	70
St. Mary's M. L.	61
Santa Fe	‡.35
Seneca	22½
Shannon	3
Shattuck-Ariz	‡15½
So. Lake	‡3
So. Utah	.35
Superior	7½
Superior & Bost	3
Trinity	‡1
Tuolumne	2
U. S. Smelting	67½
U. S. Smelting, pf	48
Utah Apex	2½
Utah Con	10
Utah Metal	4
Victoria	‡3
Winona	‡2½
Wolverine	25

N. Y. Curb.†	Aug. 26
Alaska B. C. Met	1
Alaska Mines	.50
Big Ledge	7/8
Butte & N. Y	‡ 7/8
Caledonia	39
Calumet & Jerome	.25
Can. Cop. Corpn	1⅛
Cashboy	.05
Con. Ariz. Sm	1
Con. Coppermines	6
El Salvador	3½
Goldfield Con	.17
Goldfield Merger	.04
Hasbrouck Divide	.11
Hecla Min	5½
Howe Sound	‡4⅜
Louisiana	3
Magma	‡40
Marsh	.09½
McKinley-Dar-Sa	.60
Milford	‡.75
Mother Lode	.46
Mother Lode, (new)	‡4½
Nixon Nevada	23
Ohio Cop	.50
Rawley	‡2½
Ray Hercules	2⅞
Richmond	‡.50
Rochester Mines	‡.19
Silver King of Ariz	¾
So. Am. G. & P	10
Standard S. L	.25
Stewart	‡.24
Success	.05
Tonopah	2⅞
Tonopah Divide	5⅛
Tonopah Ex	2⅜
Tribullion	‡.27
Troy Arizona	‡.10
United Eastern	4⅛
Wilson Silver Mines	1/8

Toronto *	Aug. 26
Adanac	.08
Bailey	.03
Beaver Con	.34
Coniagas	2.00
Hargraves	.02
Kerr Lake	‡5.00
La Rose	.14
Lake Shore	‡1.00
Min. Corp. of Can	1.25
Peterson Lake	.09
Teck-Hughes	.20
Temiskaming	.35
Trethewey	.23
Wettlaufer-Lor	.02
Davidson	‡.63
Dome Exten	.30
Dome Lake	‡.17
Hollinger	6.50
McIntyre	1.62½
Newray	‡.06½
Porcu. Crown	.06½
Vipond	.20
West Dome	.10

Bid prices. † Closing prices. ‡ Last quotations.